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## AUTOMOTIVE AND TRACTOR INDUSTRY

### PROBLEMS AND TASKS FACING THE BELORUSSIAN RAILROAD

Minsk KOMMUNIST BELORUSSII in Russian No 3, Mar 79 pp 34-41

[Article by Candidate of Technical Sciences Ye. Yushkevich, chief of the Order of Lenin Belorussian RR: "The Belorussian Mainline: Problems and Perspectives"]

[Text] The rapid development of productive forces in our country and the steady growth of its economic potential are placing ever higher demands on all forms of transport. It was stressed at the November (1978) Plenum of the CPSU Central Committee that today transport has become one of the most important sectors in the campaign for a rise in production efficiency and in the quality of work. Our further successes in the development of the economic system depend to a large extent on the further improvement of its activity. The role of railway transport, which is the cheapest and most regular form of it, is especially great. More capital investments were allocated for its development during the current year than was specified by the five-year plan.

Recently, thanks to the constant concern of the Party, visible changes have been occurring on the Belorussian RR. Comprehensive development and re-equipment of transport have increased its carrying capacity. During the 10th Five-Year Plan, our collective, which consists of many thousands, has been successfully handling its assignments by utilizing rolling stock, tracks and other engineering structures with maximum efficiency. Last year, for instance, almost a hundred thousand tons of freight for the national economy was shipped above the plan. On the basis of the results of the All-Union Socialist Competition for a rise in production efficiency and in the quality of work and for successful fulfillment of the plan for 1978, our railroad was among other labor collectives awarded the Challenge Red Banner of the CPSU Central Committee, USSR Council of Ministers, All-Union Central Council of Trade Unions and Komsomol Central Committee with its name recorded on the All-Union Board of Honor of the Exhibition of USSR National Economic Achievements.

Many labor collectives of railway workers have distinguished themselves in the campaign for ahead-of-schedule fulfillment of planning quotas and a rise in the efficiency of shipments and in the quality of work. The greatest successes

were achieved by the Baranovich and Gomel' branches of the railroad and the Minsk Freight, Molodechno, Grodno and Novopolotsk stations. There are quite a few innovators laboring on the branches of the railroads, at stations and passenger terminals and maintenance sections. Among them are the comprehensive brigade of the Polotsk station (switching dispatcher and Communist A. P. Kas-tritsa) and the brigades of the Minsk reserve supply of conductors (mechanic-brigade leader and Communist Ye. I. Tomkovich) and the Brest Locomotive Depot (manager-locomotive engineer and Communist A. M. Dubogriy). Models of selfless labor have been shown by the following Communists: S. S. Kozarez, foreman of the Vitebsk Locomotive Depot, N. V. Komlik, senior foreman of the Minsk Railroad Car Depot, S. I. Dikovitskiy, brigade leader of Track Machine Station No 117, P. V. Samusik, driver of an electric loader on the Brest Mechanized Section for Loading and Unloading Operations, and many others.

The patriotic movement for achievement of the best results in construction and for the highest impact from the assimilation of new technology and advanced processing methods, mechanization and automation of basic and ancillary processes has developed and become widespread. Komsomol members and young railway workers are competing for the creation of a Komsomol-youth unit train honoring the 10th Five-Year Plan on the railroad. Many engineering and technical personnel and workers are participating in the contest of engineering creativity in competition for the Prize imeni Hero of the Soviet Union K. S. Zaslouov. A Prize imeni Locomotive Engineer V. A. Yaskevich, who died heroically while saving the lives of passengers, has been set up.

We are attaching great importance to organizing the interaction of different types of transport by widely utilizing therein the experience of the collectives of the Leningrad Transport Junction and enterprises of Chelyabinskaya Oblast. Competition by workers in related industries--motor vehicle workers, river transport workers, railway workers and employees of industrial transport--enables one to utilize rolling stock in a better way.

The innovation of the collective at the classification yard of the Minsk Freight Station has been spread in every kind of way. By creatively applying the experience of the transport workers of the city of Leningrad, this collective stepped forth last year with an initiative to develop competition for the transformation of the Minsk junction into a junction of advanced processing methods and businesslike cooperation. The employees of the station, the motor vehicle combine and nine enterprises made height ned pledges directed toward reducing lay-overs and increasing the load in railroad cars. They kept their word. The collective was awarded the Certificate of Honor of the Supreme Soviet of the Belorussian SSR.

The experience of the people of Minsk has been seized upon by the collective of the Novopolotsk station, which has stepped forth as initiator of a reduction in time norms for the layover of railroad cars. This initiative was supported by the collectives of the Molodechno, Baranovich Central and other stations. Railway workers at the Kobrin station have gone even further. They have joined the movement for efficient utilization of the technical means of the employees

of the mechanized section for loading and unloading operations, track maintenance and communications. The traffic controllers on the Brest Branch of the railroad have spread the campaign for fulfillment of all planning indicators by each station in the traffic control section. As a result, the quality of maintenance of line stations has risen and layovers of railroad cars have been reduced noticeably at many of them.

At the same time, one must admit that, although the railroad did overfulfill the assignment in terms of freight turnover, we still do not provide fully for the needs of the republic in terms of shipments, and what we do is not always done in a smooth-flowing manner. More often than not this happens not owing to a shortage of railroad cars or the absence of freight, but rather owing to the low level of organization of operations work on the railroad and in its sub-units. Last year, for instance, nearly 6,000 trains departed late; the above-norm layover of these trains exceeded 760,000 railroad car-hours. Our Party organizations are analyzing in depth the reasons for these breakdowns and are taking energetic measures so that each link might work better, more productively and with a greater degree of coordination.

The collective of the railroad has adopted a counter plan and stepped-up socialist pledges—to fulfill the planning quota ahead of schedule and to ship additionally 320,000 tons of freight during the fourth year of the five-year plan and, in conjunction with this, to save 3,000 tons of fuel and one million kwt/hr of electric power. It has been stipulated that it lower the production cost of shipments by 0.1 percent and obtain no less than 240,000 rubles of above-plan profit.

In order to cope successfully with these stepped-up pledges, we are concentrating basic capital investments on the most important objects of the railroad, ones which provide for an opportunity to increase the through-put and carrying capacity of the sections and the processing capacities of stations. A rise in the level of production will be achieved chiefly through the introduction of new equipment, progressive processing methods and advanced experience.

The fourth year, just as the previous years of the five-year plan, will become a year of further re-equipment of the mainline. Many sections of the railroad, especially single-track ones, are now having difficulty handling the passage of a constantly growing number of freight and passenger trains. Hence, as a first order of priority, work is continuing on the conversion of single-track stretches into double-track stretches. More than 370 km of the railroad are being equipped with progressive means of train traffic control—automatic blocking and centralized traffic control. The carrying capacity will increase and the speeds of trains will rise on these sections, which will enable a reduction in the periods of time required for the delivery of freight and the period of time that passengers are on the road. During the current year, the last steam engine will be retired after completing its many years of service on the railroad. Capital work is being carried out on strengthening 1,900 km of track, which will provide an opportunity to let more powerful contemporary diesel locomotives pass through at the head of trains and to increase the traffic speed.

Reconstruction work includes the use of rails of heavier types, the laying of welded "velvet" tracks on reinforced concrete ties and the replacement of sand ballast with broken stone ballast. As a result, almost everywhere freight trains will travel at a speed of 90 km/hr, while passenger trains will be able to reach a speed of up to 140 km/hr on some stretches.

Construction of an electrified section of the railroad from Smolensk to Orsha will be completed by the end of the year. When it is put into operation, all freight and passenger trains from Moscow to Orsha will travel at high speeds, while powerful electric locomotives will travel at their head. It is difficult to overestimate the significance of this event, since it provides a stimulus for the further electrification of freight and passenger traffic on the main international Moscow-Orsha-Brest route.

We are paying great attention to the re-equipment of our basic stations, which are the points for the marshaling of unit trains and mass loading, and, on this basis, to heightening their processing capability. The total reconstruction of the Orsha Central Station will be completed. During the first quarter, a new, more improved system of electronic control of all switches and signals from one central post will be introduced here. A similar system is also being created at Stepyanka, the largest freight station.

The introduction of these systems will enable one to prepare the itinerary for each train in 3 to 5 seconds instead of 7 to 12 minutes and to accelerate the forward movement of trains and switching consists through stations and, hence, the shipment of freight to our consignees.

In order to increase and speed up shipments, we are attempting to utilize internal resources as well, which does not require additional expenditures. Each classification yard has received a quota for the marshaling of heavy-weight unit trains. The engineers at these depots have made a pledge to run heavy-weight trains on all sections through maximum utilization of the capacity of locomotives. As a result, the joint well-coordinated work by locomotive brigades and employees of stations will provide an opportunity to ship 16 million tons of freight in heavy-weight trains during the year. This will permit one to economize on 20 trains daily, which means the opportunity will arise to let additional consists through, consists that carry the above-plan output of enterprises, construction projects, kolkhozes and sovkhozes. Noteworthy also is the fact that locomotive engineers on heavy-weight trains, as a rule, are also striving for a saving on fuel, in addition to an increase in shipments of freight.

The technological routing of shipments has become the most important means for speeding up the forward movement of railroad cars and a saving on transport outlays. At one time employees of the Belorussian RR worked up their own system. The main point of it was that railroad cars loaded at the station of departure were joined into unit trains according to a special processing method; these unit trains ran many thousands of kilometers to the stations of destination without being remarshaled at classification yards, which saved 6 to 7



hours at each such yard. A unit train passing through three classification yards without remmarshaling would usually be delivered to the point of destination a day faster.

To be sure, the running of unit trains of shipments has a good effect only when both freight shippers and freight consignees work in a well-coordinated fashion. But it not infrequently happens that the enterprises receiving crushed stone, gravel, cement, etc. by unit trains delay the railroad cars for long periods of time owing to a narrow unloading frontage. Last year, for instance, the ministries of industrial construction, rural construction and construction and utilization of roads paid more than 227,000 rubles for above-norm layovers. It appears that it would be far more advisable to utilize these funds for an expansion of the unloading frontages on industrial sidings.

The efficiency of utilization of the fleet of railroad cars depends to a large extent on a rational load on it. Compact stowage of freight in railroad cars, the use of packaging materials corresponding to it in terms of size and the loading of light-weight freight together with heavy-weight freight—these are the basic principles that were assumed to be the basis of the joint initiative of the employees of the Borisov station and enterprises of the city. This initiative has been picked up along the entire Belorussian RR, as well as beyond its limits. Advanced methods of compacted loading of railroad cars provided the opportunity last year to load 700 kilograms of freight above the norm into each of them. Through this alone, more than 66,000 railroad cars were economized for the year. Above-plan freight was shipped in them.

Unfortunately, many enterprises do not display the proper concern about compacting the load and improving the utilization of the carrying capacity of railroad cars. Spot-check weigh-ins of freight have shown that every fifth railroad car is underloaded, although it is noted in freight documents, as a rule, that the carrying capacity has been fully utilized. Particularly often, it is enterprises of the Vtorchermet [Plant for the Processing of Secondary Ferrous Metals] Association, of the Belorussian SSR ministries of rural construction, the food industry and timber industry and the Belkoopsoyuz [Cooperative Union of the Belorussian SSR] that underload railroad cars. If the Ministry of the Timber Industry, for instance, resolved the question of shipment of saw-dust in favor of shipment in compression-molded form, then up to 5,000 railroad cars would be freed annually. The Belorussian SSR Ministry of the Fuel Industry could ship tens of thousands of tons of peat in addition provided that it was compacted in railroad cars by rolling presses.

Recently, the progressive method of shipping freight in general-purpose containers and by packets has been more and more widely used. The use of containers permits enterprises to avoid the wrapping of freight in packages, while the use of packets provides an opportunity to prepare freight for departure beforehand, without having to wait for the railroad car. Both methods provide for the full mechanization of the process of loading and unloading and, on this basis, for a considerable reduction in the layover of railroad cars and in labor input.

Container platform-terminals, on which powerful cranes have been set up, enabling one to conduct loading and unloading of large-tonnage containers with a weight of up to 30 tons, have been created recently at railroad stations in all urban centers of the republic and in many other cities. It is planned to ship 1,181,000 tons of freight in containers, including 459,000 tons in large-load containers, during the current year. Unfortunately, although the delivery of freight in large-tonnage containers has already reached the level of more than one-third of all container shipments, enterprises often utilize them in an unsatisfactory manner. These containers, as a rule, are detained for long periods of time during loading at the shippers' and during unloading at the consignees' platforms. As a result, the turn-around time of the rolling stock is slowed down. It is also absolutely intolerable that many enterprises still do not meet the necessary specifications for receiving and shipping large-load containers.

Our railroad must deliver almost 4,500,000 tons of freight during the current year in packets and on pallets. This method of shipment, however, is being introduced in a piecemeal fashion. Let's take, for instance, enterprises of the timber, wood processing, pulp and paper and chemical industries, which dispatch only 40 to 60 percent of freight by packets. The Klimovichi, Irona and Grodno building materials combines ship lime brick and blocks in a rather small quantity in packets and on pallets, as do the Dobrush Paper Factory, the Usipovich Cartboard and Roofing Felt Plant and the "Polimir" and "Khimvolokno" [Chemical Fiber] associations with finished products. Many ministries and departments don't even have plans for making the transition to this progressive method of operations.

Up until this time they have not had the necessary gear in the port of Mozyr' for the reloading of large-scale and bundled scrap metal from the railway to the water. Hence, we were forced to allocate railroad cars for the delivery of metal to the address of the Zaporozhstal' [Zaporozh'ye Steel Mill] Plant. And this means 200,000 tons of freight annually. At the same time, our river transport workers colleagues run empty vessels to that location after unloading ore and coal owing to the absence of cargo. In our view, this question must be resolved without delay and only then will nearly 4,000 railroad cars be freed for the shipment of other freight.

Perhaps the most critical problem that we face is that of reducing the periods of time for use of railroad cars. The railroad is one of the sectors of the national economy in which the most important assets, which are railroad cars, are to be found not only in the hands of their direct owners, the railway workers, but also in the hands of the numerous shippers and consignees of freight. There are quite a few questions here requiring solution without delay. Nearly 70 percent of materials handling operations are carried out on the industrial sidings of the freight owners. Railroad cars are engaged directly in loading or unloading more than a third of the total time that railroad cars are in freight stations. And although layovers owing to delays on industrial sidings by some enterprises were reduced on the railroad last year in comparison with the previous year, each railroad car in the republic lay idle

almost half as near above the established norm. More than 116,000 railroad car-days of loading resources were lost.

Such a situation has been created because the managers of many sectors of the republic's economy and of enterprises treat the operations of their railway shops as ancillary, not as part of basic production. Transport capacities are not infrequently operated with flagrant deviations from the rules and often industrial sidings cannot let modern diesel locomotives and large-load railroad cars pass through at the necessary speed. Many shops have not been fully staffed with manpower and specialists who know their work. There is no genuine concern about locomotives and railroad cars. They make it to repairs only after they have finally gone out of operation.

Railway services at new enterprises are developing extremely slowly. For instance, the Mazyr' Oil Refinery has already practically mastered production of the planned output, which is being shipped to all ends of the country, but the devices for readying and filling the tank cars have not been fully installed. Such a situation also exists at the Grodno "Azot" [Nitrogen] Association. The enterprise is continuously putting more and more new capacities into operation, but only approximately 50,000 rubles of the 2,000,000 rubles stipulated in the estimate for the past four years have been spent on the construction of the rail's station, to which the plant's industrial sidings are joined. The railroad cars headed for this enterprise lie idle for a long time at other stations awaiting delivery to the plant. The Belorussian SSR Ministry of Procurements is not increasing the unloading frontages and mechanization of operations.

Some ministries and departments and enterprises do not display the proper concern for the mechanization of loading and unloading operations. Its level does not exceed 40 to 50 percent in many places, while the remaining freight is processed manually. Particularly lagging in this work are the Belorussian SSR ministries of procurements, meat and dairy industry and food industry, the Belkopolye and the Bobruysk Tire Combine.

Naturally, there are also quite a few examples in the republic of genuinely thrifty maintenance of transport capacities and of good organization of shipments on industrial sidings. Thus, the Mogilev Metallurgical Plant, the Mogilev Motor Vehicle Plant and the Osipovicha Carboard and Roofing Felt Plant have stepped forth with a valuable initiative directed toward a reduction in the layovers of railroad cars. The innovation was approved by the Central Committee of the Communist Party of Belorussia. The transport shops of these plants are fulfilling their commitments with honor: last year they reduced the layovers of cars and economized by 1,526 railroad cars. The experience of the pabemakera deserves widespread support by other enterprises.

The efficiency of our operations depends to a large extent on planning. One should exclude irrational cross hauls, repeat shipments and short-run hauls from the plans. This not only frees rolling stock, but also provides a great saving in funds. In order to alleviate the load on the railroad, last year we handled over 102,000 tons of short-haul freight to motor vehicle transport.



More than a million tons were transferred to river transport workers. The exclusion from the plans of irrational shipments enabled us to free 2,500 railroad cars for the delivery of other freight for the national economy.

There is quite a bit of work that still faces us in the area of improving planning. It is time, finally, to put an end to cross hauls of reinforced concrete products within the republic. It is necessary as early as this year to rule out the delivery by trains of petroleum products and peat over a distance of less than 30 km. It is not advisable to haul wine and glass dishware by rail transport within oblasts, as well as perishable products over distances less than 200 km.

There are quite a few reserves as well in the further improvement of the organization of freight operations being performed by the forces of mechanized sections of the railroad. For instance, a point for handling large-tonnage containers has been put into operation at the Berezina station, while we are organizing the centralized hauling in and out of freight by motor vehicle transport at the Koydanovo station. Eight line stations of the railroad, after receiving the necessary gear, will be converted into pivotal freight stations for the sections, with a concentration of all freight operations at them, while neighboring stations that have little work to do will be closed. The modernization of electric gantry cranes will continue. We will adapt them to work with self-locking devices, which will provide the opportunity to perform the slinging into position and away from location of containers without human participation. All this will enable one to raise the level of mechanization of loading and unloading operations up to more than 90 percent.

The prompt delivery of railroad cars for loading and unloading and the forward advance of the flow of railroad cars through junctions and along stretches is unthinkable without the well-coordinated and smooth operation of locomotives. During the past three years, the productivity of each of them already reached the level planned for the end of the five-year plan. The experience of our railroad in the steady operation of the diesel locomotive fleet was approved by the USSR Ministry of Railways and recommended for introduction throughout the entire country. But we are not intent on resting on our laurels, but will henceforth develop locomotive services. The points designated for technical inspection of diesel locomotives at the Baranovichi, Orsha, Brest and Volkovysk depots will obtain new prefabricated buildings made of light metallic structures. Construction of operations shops will be completed at the Molodechno and Orsha depots.

We are showing particular concern for hauling passengers. Our railway workers are striving to observe the traffic schedule and to increase the scheduled and section speeds of passenger and suburban trains. The level of service at passenger stations and en route has risen. The train made by the "Belorussiya" firm has obtained All-Union recognition. The collectives of the passenger terminals at the Brest and Baranovichi-Poleskiye stations have achieved a high level of service to passengers. The suburban stretches from Minsk to Molodechno and Minsk to Pukhovichi have been well arranged and managed in an over-all manner. The sale of tickets has been fully automated on these sections.

At the same time, we are not closing our eyes as well to the existing shortcomings. They were brought to light in a most principled manner at an expanded meeting of the technical and economic council of the railroad. A lack of administrative abilities on the part of station employees, instances of locomotives breaking down en route, disrepair of railroad cars and many other factors still have a strong effect on the quality of passenger transport. All these shortcomings were manifested with particular acuteness this winter. One also cannot be reconciled to the kind of situation where normal conditions are not created for passengers en route owing to certain negligent employees. Our Party organizations are striving to provide the proper evaluation for each such case and are continually and persistently pointing labor collectives in the direction of eradication of the shortcomings.

For a further improvement in passenger services, it has been planned to build 16 modern passenger pavilions during the current year along sections of the railroad. Improvements in public services and amenities at passenger buildings along the entire Minsk-Brest route will be completed. The volume of services will grow in terms of advance sale of tickets and their delivery to one's home address. We will increase the sale of tickets with a through seat reservation and for the return trip. Nearly five million passengers will be provided with these services. We shall substantially improve information services by means of introducing modern technology. The installation at passenger stations of new automatic ticket-printing vending machines and machinery is continuing. Great attention will be paid to raising the level of service to passengers on trains. New firm-built trains will begin to run on the Grodno-Moscow and Minsk-Leningrad routes with the introduction of the summer schedule.

The management of shipments becomes more complex with the growth in the volume of operations on the mainline. In connection with this, the development and improvement of an automated control system is assuming particular urgency. The task of automating the issue of plans at all levels of operations planning of the shipping process on the basis of machine processing of primary documents is now being accomplished. Definite results have already been achieved in this direction. Our experience in the introduction of an automated control system has been approved by the USSR Ministry of Railways and recommended for dissemination on all the country's railroads. Machine simulation of the time for advance movement and delivery of railroad cars for unloading, as well as the automation of the release of data on the make-up of trains with computer assistance will be introduced during the current year. The means of computer technology necessary for this already exist on the branches of the railroad, where there are already third-generation computers available. The task is one of using this latest technology efficiently and with a full yield.

Last year, quite a bit of work was done on the railroad to draft comprehensive systems for production quality control over the work and services being performed. These systems are being improved at base enterprises and are being introduced along the entire railroad after completion of the drafting.

The urgent problems of the Belorussian mainline and the prospects for its development were widely discussed in the Party organizations of our collectives

during the period of reports and elections. In a spirit of self-criticism, Communists dealt with evaluating what has been achieved, subjected shortcomings to sharp criticism and defined practical measures for successful fulfillment of the goals of the five-year plan. A broad program has been outlined not only to improve economic indicators and to improve management, but also to solve social problems. It includes the further expansion of the network of and improvement in the quality of medical and trade services for railway workers, the construction of housing and children's preschool institutions and an upsurge in sanitation, mass cultural and sports work. Quite a bit will be done to strengthen labor safety regulations and practices and to create optimum conditions for people's work and time-off.

The railway workers of the Belorussian mainline are full of determination to multiply efforts to fulfill the plans for the fourth year of the five-year plan and the pledges that have been adopted and to make a worthy contribution to the successful fulfillment of the tasks defined by the 25th Party Congress and the November (1978) Plenum of the CPSU Central Committee for railway transport.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### USE OF SPACE PHOTOGRAPHS IN CONSTRUCTION PLANNING

Moscow NA STROYKAKH ROSSII in Russian No 4, Apr 79 pp 44-46

[Article by A. Melua, head of the section on space and laser investigations, Leningrad Scientific Research Institute of Practical City Construction]

[Text] The development of the eastern regions of the country is one of the timely problems in the national economy. The minerals explored here even now require concentrations of great work and material resources. The inflow of work personnel is bringing about the creation of new populated places, the necessity for further improvements in the settlement system. These problems must be solved on the basis of regional planning proposals. However, for the regions of the Far North and East of the country their formulation is complicated by severe climatic conditions.

In connection with the construction of the Baykal-Amur Railroad, the problems involved in settling people and city construction in this region have received qualitative development. The importance of initial information has increased. Recently the Leningrad Scientific Research Institute of Practical City Construction has done much work in seeking new ways to obtain such information for architectural and structural planning. For the collection of this information it has become increasingly common to use remote research methods, which are promising for great territories, among which the most important is a space survey of the earth.

One of the first scientific research studies in this direction is the "Investigation of the Geomorphological Conditions for Construction in the Region of the Baykal-Amur Route: Nizhne-Angarsk-Tynda," which is being carried out at the present time at the Leningrad Scientific Research Institute of Practical City Construction. The program provides for the further development of methodological principles for the analysis of space photographs for the purpose of establishing settlements and city construction, interpretation of the photographs obtained and use of the results in practical planning.

Earlier initiated work for the analysis of space photographs was carried out for regions in Leningradskaya Oblast. Studies were made of the distribution and state of different natural and anthropogenic features: vegetation, water and air basins, roads and populated places.

The results of interpretation of the photographs made it possible to make preliminary proposals on the rational use of the environment and the development of populated places. A careful study was made of the relationship between forested and open spaces; this made it possible to discover favorable regions for the organization of recreational zones.

An analysis of the space photographs obtained and topographic maps indicated that in many cases there is a noncorrespondence between the real and mapped distribution of features. This once again confirmed the value of routine space information even for such densely forested regions as Leningradskaya Oblast.

Daily observations of the dynamics of the snow and ice cover from space reveal zones with favorable conditions for the development of winter types of sport and construction of the corresponding bases.

Also discovered were harmful effects on natural features: thermal contamination of water bodies, waste ejection into the atmosphere from industrial enterprises, etc. The latter information has multiple values: evaluation of the level of operation and recommendations on the development of purification structures, restriction on the construction of health and rest institutions.

Space photographs constitute a specific form of information having its advantages and disadvantages. Different technical conditions for surveys make it possible to obtain photographs of virtually all possible scales, each of which can be used in construction for solution of different problems.

All space photographs have one thing in common — interpretation criteria for the features forming the image. But there are differences which are dictated by regional conditions, peculiarities of the territory and the formulated problems.

When work was begun in different regions of the Baykal-Amur Railroad it became necessary to create a special information system which makes it possible to accumulate (in time) the results of a thorough differentiated analysis of aerospace photographs. Such a system is the Applied Space Information Bank (ASIB) developed at the Leningrad Scientific Research Institute of Practical City Construction (Fig. 1). It is now being introduced.

In the analysis of space photographs interpretation keys (IK) of eight types are developed: vegetation, hydrology, geology, populated places, roads, individual structures, land use, quality of the environment. Each of the types is made up of a number of IK subtypes. The scale of the IK is dependent on the scale and type of the photograph. The keys are coded. The interpretation key codes (IKC) describe the date of the survey, the content of the key, the territory, etc.



IK in the form of microcards (MC) are stored in the IK MC archives and their codes in the IKC archives. The IK nomenclature was developed on the basis of the nomenclature of cartographic materials used in the USSR. The preparation of IK of a definite subtype is repeated after some time interval whose length is dependent on the dynamics of change of the features shown on a particular IK.

In case of a need for information the user prepares its code "IKC interrogation," which is compared with the IKC present in the archives. After obtaining the result "IKC response" the receiver can be sent a printout of the codes "1P" of available IK or an order can be given "IK MC search" for copies of the corresponding IK. Then the graphic information "IK MC response" is requested from the IK MC archives.

If the user is interested only in these IK, copies of them are made and sent to the user "2P," after which the IK MC are returned to the archives. If some operations must be performed on the IK (summation, calculation of areas, transformation into tabular form, etc.), there is a readout of the IK, storage of their content in the computer operational memory and after corresponding analysis -- feedout of the results to the user "3P."

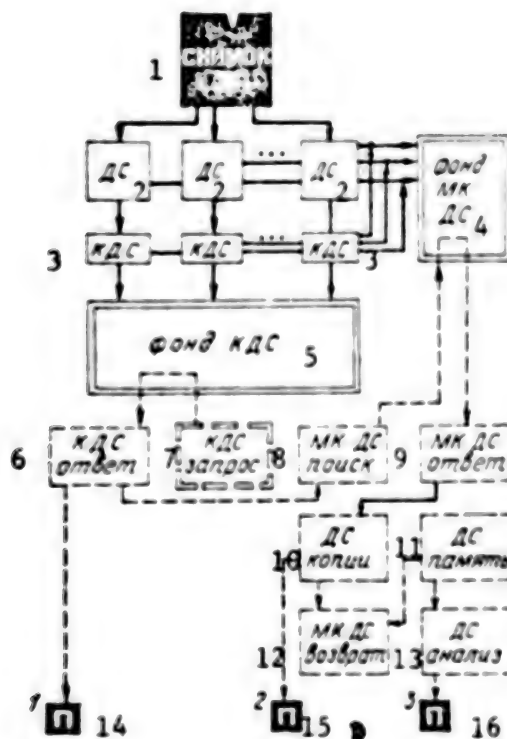


Fig. 1. Structural-technological scheme of Applied Space Information Bank:

[Key on following page]

- |                      |                   |
|----------------------|-------------------|
| 1. Photograph        | 9. IK MC response |
| 2. IK                | 10. IK copies     |
| 3. IKC               | 11. IK memory     |
| 4. IK MC archives    | 12. IK MC return  |
| 5. MC archives       | 13. IK analysis   |
| 6. IKC response      | 14. P1            |
| 7. IKC interrogation | 15. P2            |
| 8. IK MC search      | 16. P3            |

The Applied Space Information Bank can be used in solving a variety of scientific and national economic problems. We will examine a scheme for solving the problem of selecting the site for placement of a populated place in the case of an arbitrarily taken model (Fig. 2).

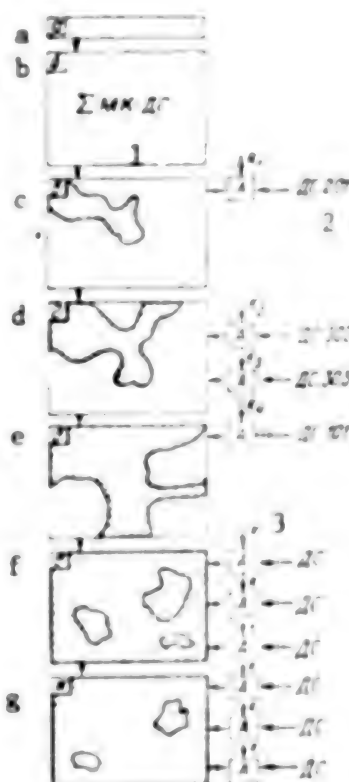


Fig. 2. Diagram of solution of problem of selecting site for placement of populated place.

KEY:

1. IK MC
2. IK
3. C -- criterion for analysis of IK

The input data (2a) describe the approximate region for the populated place, the principal purposes (necessity) of creating a populated place and its size. On the basis of these data the IK archives is selected (2b). Thereafter an IK analysis is made on the basis of specific criteria (C). The sequence of operations can be varied in individual problems. Accordingly, the scheme cited below is one of the variants.

Using an IK of the "surface waters" subtype, on which there is information on soil moisture content, on the basis of the stipulated criterion  $C_1$ , it is possible to detect territories which are unfavorable for construction in connection with swampiness -- on the scheme (key) shown in a dark tone (2c).

Then IK of the "geomorphology" and "Quaternary deposits" subtypes are analyzed, as a result of which unfavorable territories are determined on the basis of this group of criteria. The collected data are summed with the earlier prepared scheme and therefore there is a decrease in the area recommended for construction (2d).



Fig. 3. Space photograph for the Baikal region taken from the "Soyuz-22" spaceship. It shows different categories of land use, types and character of vegetation, entry of river into lake.



Similarly an analysis is made of the scheme or key for the "woody vegetation" subtype (2e) and a number of subtypes reflecting (2f) the dynamics of natural features (IK are taken for several years and the boundaries of flooding of lands, slope processes, etc. are determined). These territories are compared with respect to convenience of transportation facilities, presence of water sources and absence of minerals in the deep layers under the future populated place. At the output we obtain a diagram (2g) of the territories recommended for the siting of populated places.

The criterion C can be varied not only with respect to type, but also magnitude, in accordance with which there will be a change in the extent of the recommended territories. A change in the criterion can be tied in to the funds allocated for construction. Taking into account that the IK analysis provides for automation (see Fig. 3P), it is possible to organize a dialogue between the electronic computer and the architect, in which the latter changes the criteria and the electronic computer gives the siting regions.

The entire process of selecting IK and obtaining the overall results of their analysis for populated places of any size when using high-speed computers requires no more than 20-30 minutes. It will be sufficient to have two specialists: the operator of the Applied Space Information Bank and the architect -- the director of the team for planning the populated place. How advantageous this is can be seen from the fact, if nothing else, that at the present time the solution of such problems ties up dozens of specialists for many weeks and even months.

The advantages of the Applied Space Information Bank are obvious: the complexity of information and its interbranch significance, a high level of automation of processes. The development of space methods for investigating the earth foreseeable for the years immediately ahead will serve as a reliable source of data for the Applied Space Information Bank. Space photographs are the basic but not the only initial document for the Applied Space Information Bank. In interpretation work the researcher must also turn to the results of ground and aerial investigations.

The task for the Applied Space Information Bank is a complex of problems which can be divided into two groups. The first includes problems requiring theoretical, research, graphic-experimental work; development of interpretation criteria for features, validation of differentiation of information into subtypes and their detailed description, preparation of solutions of standard problems on the basis of the Applied Space Information Bank, validation of the periods of repetition of interpretation of photographs for specific IK subtypes. The tasks in the second group provide for the creation of special technical facilities and programmed support: automation of interpretation of photographs, automation of storage of IK MC, development of programs for the analysis of IK in the execution of standard tasks, and also programs for the storage of IKC. Some of these problems have already been solved.

It will be possible to operate the Applied Space Information Bank when a definite mass of IK is accumulated. Therefore, as soon as the basic principles of analysis of space photographs were formulated, at our institute we began regular interpretation studies and the preparation of IK. At the same time the solution of basic methodological problems is continuing. The obtaining of a sufficiently great volume of IK will make possible periodic supplying of information to interested organizations concerning the arriving IK in order that they will be able to use them.

The results of an analysis of space photographs of Leningradskaya Oblast have already been formalized in accordance with the requirements of the Applied Space Information Bank. The results of analysis of photographs for regions of the Baykal-Amur Railroad are also being accumulated. In future years with the accumulation of a sufficiently great number of interpretation schemes (keys) they will be processed not only for the purpose of studying the possibilities of siting of new populated places, but also for evaluating the recreational resources of the territory, the optimum selection of transportation lines, and evaluation of the reserves of different types of raw material for validating proposals for the construction of industrial enterprises.

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CSO- 1866

## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

UDC 69.003:65.011.1

### CONSTRUCTION PROGRAMS OF THE SOVIET FIVE-YEAR PLANS

Moscow EKONOMIKA STROITEL'STVA in Russian No 5, May 79 pp 10-13

[Article by Ye.A. Ivanov, Candidate of Economic Sciences and Deputy Chief of a department of USSR Gosplan: "Construction Programs of the Soviet Five-Year Plans"]

[Text] The Soviet people are celebrating a wonderful date -- the 50th anniversary of the adoption of the First Five-Year Plan for developing the national economy of the USSR. As pointed out in the decree of the CC CPSU, adopted in connection with this jubilee, our plans became the principal instrument for implementing the economic policies of the Communist Party. They are being implemented in behalf of strengthening and developing the socialist system, consistently increasing the productive forces, improving social relationships and systematically raising the material and cultural well-being of the people.

In solving these tasks, a very important role is being played by capital construction.

The rapid growth in the savings of the socialist economy serves as the foundation for the high rates of growth in capital construction. The high rates of growth for capital construction are also the result of the preferred growth in heavy industry, which ensures a material and physical structure for the savings that conforms with the requirements of capital construction. High rates of growth for capital construction are required for the development of the socialist economy.

The scales of capital construction during the past nine five-year plans are described by the volume of capital investments -- 1,459 billion rubles (including construction-installation work -- 945.7 billion rubles). Moreover, compared to the First Five-Year Plan when these figures amounted to 8.8 and 7.6 billion rubles respectively, by the Ninth Five-Year Plan they had increased to 493 and 299.4 billion rubles.

The Tenth Five-Year Plan called for a volume of capital investments amounting to 621.4 billion rubles, or 26 percent more than during the preceding five-

year plan. During the first 3 years of the five-year plan, 367.3 billion rubles worth of capital investments were employed and the 1979 plan called for a volume of 132 billion rubles. Thus, 499 billion rubles of capital investments were employed during 4 years of the five-year plan, more than the figure for the entire Ninth Five-Year Plan.

Each Soviet five-year plan solved its own tasks in the development of the national economy of the USSR. The branch trend in the use of capital investments corresponded with these tasks.

During the pre-war period, the principal bulk of the capital investments was employed for creating the branches of heavy industry. Capital investments in Group "A" branches of industry during the First Five-Year Plan amounted to 83.5 percent of all capital investments in industry. During this period entire branches were formed, the likes of which Czarist Russia had never known: agricultural machine-building, chemical and aviation industry, ferrous metallurgy and others. Approximately 1,500 large enterprises were placed in operation. Among them there were those which today are still ranked among the leaders of our industry -- Magnitogorsk and Kuznetsk metallurgical combines, Moscow and Gor'kiy motor vehicle plants, Stalingrad and Khar'kov tractor plants, the Frezer and Kalibr machine-building plants and many others.

During the Second Five-Year Plan, the possibility was already at hand for expanding the construction of enterprises of the light and food industry. Their proportion increased somewhat, despite the fact that the proportion of capital construction in heavy industry continued to remain rather high.

During this period, 4,500 new and large enterprises were placed in operation. Included among them were the Krivoy Rog and Novolipetskiy metallurgical plants, Azovstal' and Zaporozhsta', the Novo-Kramatorskiy Machine-building Plant, Uralmash and others.

A vast construction program was outlined for the Third Five-Year Plan. However, the creative endeavors of the Soviet people were interrupted by the fascist invasion. The war inflicted tremendous damage on the development of the national economy. The aggressors destroyed and plundered thousands of enterprises in various branches of the economy and culture. The restoration of the destroyed plants and factories began even while the war was still in progress. During this period, 7,500 large industrial enterprises were restored in regions liberated from the enemy. Included among them were the Kramatorskiy Machine-building Plant, the Khar'kov Tractor Plant and the Yenakiyevo, Alchevskiy and Makeyevka and other metallurgical plants.

During the post-war period, the Soviet Union, owing to the broad scope of its capital construction program, succeeded not only in rapidly healing the wounds sustained during the war but in addition it achieved unprecedented development for all branches of its national economy. Approximately 14,000 large state industrial enterprises were built during the first three post-war five-year plans.

The restoration of the national economy was completed during the Fourth Five-Year Plan. Capital investments were employed primarily for this purpose during this period, despite the fact that new construction was also being carried out. During these same years, 6,200 large industrial enterprises were placed in operation, including a plant for heavy machine-tool production in Kolomna and a turbine plant in Kaluga. In the Ukrainian SSR the Zaporozh'ye and Krivoy Rog metallurgical plants were restored and a large number of coal mines, many thermal electric power stations and hydroelectric power stations, including the Dnepr GES imeni V.I. Lenin, and other enterprises were built and restored.

The following two five-year plans were five-year plans devoted primarily to new construction. Many new facilities were placed in operation during this decade: the first atomic electric power station in the world, the Irkutsk and Novosibirsk hydroelectric power stations, the Kamyshin, Barnaul and Kheison cotton combines, many large and medium metallurgical plants, mines, enrichment factories and so forth. The preferred use of capital investments during these years for new construction was dictated by the need for ensuring further development of the national economy in terms of powerful technical resources, the expanding, technical improving and reconstruction of which would serve as a reserve for achieving rapid rates of growth during subsequent years.

New construction was continued on an extensive scale throughout the Seventh Five-Year Plan. The extensive construction of chemical industry plants was launched during this period. Large-scale chemical combines were placed in operation -- Nevinnomyssk, Shchekino, Cherkassy and Kadinskiy, the Soligorsk Potassium Combine, the Sumgait and Gomel' superphosphate plants and others. Power engineering construction operations continued. Thermal electric power stations were placed in operation at Belovo, Nazarovo, Novocherkassk and Berezovo and the Bratsk GES, the largest in the world, was also introduced into operations. The Western Siberian Metallurgical Plant, the Korshunovskiy Mining-Enrichment Combine and the Krasnoyarsk Aluminum plant also entered operations.

Large changes took place in capital investment trends during the years of the Eighth Five-Year Plan. These changes came about as a result of the decisions handed down during the 18th CPSU Congress, which called for substantial structural changes in the Soviet economy aimed at the priority development of those branches which ensure technical progress and also those branches engaged in the production of consumer goods, particularly agriculture. In conformity with this plan, the branch distribution of capital investments was implemented. Thus the volume of capital investments in agriculture doubled during this period.

At the same time, a considerable increase took place in the volume of capital investments employed for expanding and modernizing existing enterprises which entered operations mainly during the Fifth and Sixth Five-Year Plans and also for improving their technical re-equipment status and production



mechanization and automation. In 1970 the proportion of capital investments employed for the expansion, modernization and technical re-equipping of existing enterprises amounted to 58 percent of the overall volume of centralized investments.

At the same time, large-scale new construction work continued. It was precisely during this period that the development of western Siberia -- today the country's principal petroleum and gas production region -- began. The Krasnoyarsk GES entered operations and thermal power stations having large special purpose units for 500,000 and 800,000 kilowatts were built. In all, approximately 1,900 new industrial enterprises were placed in operation during this five-year period.

The 24th CPSU Congress, which approved the directives for the Ninth Five-Year Plan, adopted a course aimed at achieving further intensification of the investment process. Greater amounts of capital investments were employed for the expansion, modernization and technical re-equipping of existing enterprises, the proportion of which reached 66 percent of all centralized capital investments by the end of the five-year plan. Capital construction during this period brought about progressive structural improvements in the national economy, improvements which were in keeping with the requirements of the scientific-technical revolution, and also the accelerated introduction of new equipment and technology for promoting an intensification of social production.

A characteristic feature of the investment policy during the Ninth Five-Year Period was the decisive program aimed at creating large territorial-production complexes having efficient interrelationships existing between their subordinate enterprises and production efforts, complete interlinking of capabilities and agreement with regard to the schedules for placing them in operation.

Work commenced on the formation of the Sayanskiy Territorial-Production Complex of the Sayano-Shushenskaya GES, an aluminum plant, a railroad car construction plant, a plant for steel castings and on enterprises of the light and food industry. Work continued on the development of the Bratsk Territorial-Production Complex, consisting of the Bratsk Aluminum Plant, the Bratsk Timber Industry Complex, the Ust'-Ilimsk GES and the Ust'-Ilimsk Timber Industry Complex. Extensive construction work unfolded in western Siberia.

During the Ninth Five-Year Plan, approximately 2,000 large industrial enterprises were placed in operation, including the Leningrad Atomic Electric Power Station, Volga Automobile Plant, an electro-chemical combine in the city of Naviol and others. The principal volume of work concerned with the construction of KamAZ was carried out.

The investment policies of the Party during this modern stage are clearly set forth in the "Principal Trends for Developing the National Economy

During the 1976-1980 Period," adopted during the 25th CPSU Congress. During the Tenth Five-Year Plan -- a plan devoted to achieving efficiency and quality -- a program is being followed aimed at raising decisively the efficiency of capital investments and their concentration in the principal areas of social production.

In each branch of the national economy and industry, capital investments are being employed primarily for solving the basic tasks associated with scientific-technical progress, tasks which derive from a single technical policy.

In electrical engineering the intra-branch distribution of capital investments was subordinated to solving the tasks associated with achieving further growth in the country's power engineering potential, mainly through the use of hydraulic energy, atomic fuel and cheap coals procured by means of open-cut mining. Such a change in the structure of the power engineering capabilities placed in operation is beyond the capability of just one five-year period.

Capital investments in the coal industry are used primarily for the construction of pits for extracting coal by means of open-cut mining in the eastern regions of the country and also for the reconstruction and modernization of existing mines in the Donets, Kuznetsk, Karaganda, Pechora and other basins.

The principal task of capital construction in the oil and gas industry is that of laying down powerful pipeline systems having automatic equipment. The Tenth Five-Year Plan has been characterized by the accelerated construction of large-scale underground storage capacities for reserve gas supplies for use during the winter period.

Large and powerful units and also departments for the final processing stage are being erected in metallurgy for the production of the more economic types of rolled metal. The construction of mining enterprises, particularly in non-ferrous metallurgy, is being accelerated considerably.

The capital investment policies with regard to the chemical industry are directed towards the accelerated development of the production of raw materials for the light industry and mineral fertilizers and also for achieving the intra-branch proportions.

A substantial change is taking place during the Tenth Five-Year Plan in the distribution of capital investments among the individual branches of machine-building. During the past 10 years, special attention was given to construction in the automobile industry. Considerable increases are presently taking place in capital investments for developing the branches of machine-building and for providing the national economy with technological equipment.

During the current five-year period, capital investments will be employed in the light and food industry for carrying out considerable technical re-equipping and modernization of enterprises and also equipment modernization.

Intensive construction work is being carried out in agriculture, the development of which is consuming approximately 30 percent of all capital investments in the national economy. Moreover, special attention is being given to land reclamation construction and also to the construction of large-scale livestock husbandry complexes. This program was once again confirmed by the July (1978) Plenum of the CC CPSU.

Deserving of special emphasis is the fact that construction in all of the branches is being carried out in a mutually related manner and within the framework of territorial-production complexes which serve to ensure balanced development for all of the union republics and economic regions.

During the Tenth Five-Year Plan, the priority program for expanding, modernizing and technically re-equipping existing production efforts will be intensified to an even greater degree. The rates of growth for capital investments for this purpose are two times higher than those for industry on the whole.

The past 3 years of the Tenth Five-Year Plan have shown that the tasks confronting the builders are being carried out for the most part. As a result of implementation of the construction program for the five-year plan, the fixed production capital of the national economy increased by 195 billion rubles and reached 1 trillion rubles by the beginning of 1979. More than 700 large industrial enterprises were built. Included among them were the Lisichansk Petroleum Refinement Plant, an oxygen-converter complex at Azovstal', a blast furnace at the Novolipetsk Plant and many others.

During the period of the Soviet five-year plans, a radical changes has taken place in the logistical base for construction. From a comparatively small branch based almost entirely on manual processes, carried out directly at the construction sites, construction has been transformed into a powerful, highly mechanized and well equipped branch of material production, with industrial methods being employed for carrying out the work. Accordingly, changes have taken place in the organizational forms of construction.

It was during the period of the pre-war five-year plans that the conversion over to the contractual method for carrying out construction work commenced. Compared to the first decade of Soviet rule (1918-1928) when the proportion of contractual construction work amounted to only 10 percent, by the beginning of the war it had already risen to 51 percent. Industrial construction methods were initially introduced during the first five-year plans and it was during this same period that construction was converted over to year-round work and the process of creating cadres of permanent construction workers commenced.



The use of precast structures commenced back during the Fourth Five-Year Plan. The All-Union Conference of Builders, which convened during the autumn of 1954, was of special importance with regard to the industrialization of construction. This conference defined the principal direction to be followed in the development of construction -- maximum industrialization, accelerated production growth, the use of precast structures, parts and units and substantial improvements in the mechanization of construction work. The construction of plants for the production of reinforced concrete structures unfolded throughout all regions of the country. As a result, during the Fifth Five-Year Plan the production of precast reinforced concrete structures increased by 4 times and during the Sixth -- by six times. This raised substantially the degree of use of prefabricated products in constructions. By the end of the Ninth Five-Year Plan, it amounted to 32.5 percent and by 1980 it is expected to reach 45 percent.

At the same time, an increase took place in the pool of construction machines. Compared to 1940, when the builders had only 2,100 excavators, 1,100 scrapers, 800 bulldozers and 1,100 mobile cranes at their disposal, at the present time there are 153,200 excavators, 43,900 scrapers, 158,200 bulldozers and 190,000 travelling cranes being employed in construction operations.

The development of the contractual method for carrying out construction work is continuing. At the present time, nine tenths of all construction work is being carried out by contractual construction organizations, a large proportion of which are operating under the conditions for the new system for planning and economic incentives.

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Our country, which is presently in the stage of mature socialism, has at its disposal a powerful economy, tremendous scientific-technical potential and politically mature and highly skilled personnel and it possesses all that is required for progressing further towards Communism.

The present period, in which the current five-year plan is nearing completion and preparations are being made for the next one, is indeed a very important one. As mentioned by Comrade L.I. Brezhnev during a speech delivered before voters in the Baumanskiy District of Moscow, new approaches are required during this modern stage in our capital investment policy and in many spheres of technical policy, available capabilities and manpower resources must be maneuvered, departmental and seniority tendencies must be overcome and planning and managerial methods within the system of indices and material incentives must also be reorganized.

The Eleventh Five-Year Plan must personify fully the economic policies of the party and it must be predicated upon the latest achievements in economic and scientific-technical thought and all accumulated experience.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### USSR GOSSTROY PREPARATIONS FOR ELEVENTH FIVE-YEAR PLAN

Moscow STROITEL'NAYA GAZETA in Russian 20 May 79 p 3

[Article: "For New Plans"]

[Text] In the interest of raising the technical level of planning for projects and reducing the schedules and cost of construction operations, USSR Gosstroy, in letter No. AB-2188-20/I dated 28 April 1979, instructed the ministries and departments on the need for developing, for the Eleventh Five-Year Plan, the principal technical trends for technological and construction planning and for continuing this work during subsequent periods.

USSR Gosstroy believes that the development of the mentioned technical trends for the ministry and department must be carried out based upon complex programs for scientific-technical progress and its socio-economic consequences in the future and with special attention being given to radically improving the quality and effectiveness of the planning solutions and their conformity to scientific and engineering achievements and to the placement of enterprises as a rule in the structure of industrial centers. Emphasis is also placed upon the need for employing space-planning and design solutions for the buildings and installations of production enterprises that will make it possible in the future to carry out the required reconstruction and modernization, without having to make serious changes in the basic construction.

It has been pointed out that the development of the principal technical trends in planning must be carried out in a manner so as to ensure their approval no later than during the first 6 months of 1980.

USSR Gosstroy has requested that a report be issued prior to 1 July 1979 on the decisions adopted with regard to organizing the development of and the schedules for approving the principal technical trends in the planning for projects of the branch during the Eleventh Five-Year Plan.

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## CONSTRUCTION, CONSTRUCTION MACHINERY, AND BUILDING MATERIALS

### PROBLEMS WITH BELORUSSIAN EXPERIMENT IN GLAVZAPSTROY

Moscow PRAVDA in Russian 4 May 79 p 2

[Article by P. Sokolov, chief of the Planning-Economic Administration of Glavzapstroy: "It Was Well Conceived"]

[Text] More than one half billion rubles worth annually -- such is the volume of work being performed by the collective of Glavzapstroy. The principal purpose of this large-scale territorial main administrative board is that of industrial construction. Moreover, three fourths of all of its resources and forces are employed for the modernization and expansion of existing enterprises.

Since last year the work carried out by the construction organizations and main administrative board of Glavzapstroy has been planned and evaluated on the whole based upon commodity construction output rather than upon the total amount of resources employed. In other words, enterprises, pilot complexes, their phases and individual projects must be prepared for the production of goods. Another important condition is that of rejecting the principle of having the customer advance the expenses required for unfinished production operations. These functions are not being performed by the bank. It furnishes credit for compensating for all of the expenditures right up until the projects are turned over for operation.

One year of work carried out in conjunction with the so-called Belorussian experiment has proven beyond any doubt the feasibility of the step undertaken. The plan for commodity output was fulfilled by Glavzapstroy by 114 percent. Tens of important national economic projects were placed in operation and many of them ahead of schedule. A reduction in the duration of the construction work made it possible to reduce the planned volume of unfinished production by 50 million rubles.

It appeared that everything was proceeding in a fine manner. However, even with favorable indices the profit plan remained unfulfilled by almost 5 million rubles. The material incentive funds decreased accordingly. The personnel were provided with fewer incentives than earlier anticipated. How could this have happened?

Any economical experiment conducted at individual enterprises must not interfere with the operational conditions at those enterprises. As is known, such conditions are dependent upon not only the collectives themselves but also upon external factors: the organization of material-technical support, transport operations and timely support in the form of planning-estimates documentation. If this is not the case, then certain costs will be inevitable, costs which will reduce to zero the value of the overall plan. Permit me to mention just a few of the more serious problems. According to the conditions for the experiment, the expenses of the contractor for constructing the project were to be covered by bank credit based upon the resources of the customers. The total amount of funds to be used for this purpose was to be released when converting over to computations not involving intermediate payments. Moreover, the credit for "unfinished projects" was to be provided prior to the actual turning over of the project for operation. Actually, this rule is frequently being overlooked.

In the settlement of Kalitino, a machine-testing station accepted a 60-unit apartment building that had been erected by a house-building combine. And suddenly the builders were considered to be guilty, although in fact they were guiltless. The estimate included still another building that had just been started by the builders, a building that had engineering networks common for both buildings. Thus the document on acceptance of an inhabited building was not issued to the contractor and the customer did not pay the 435,000 rubles for it. The bank withdrew this amount from the combine's account as having been issued earlier in the form of credit.

Nor are these singular incidents. In particular, they occur quite frequently in production and non-standard construction operations. The situation is further complicated by the fact that the contracting trust, within a period of 7 days following the report, is obligated to gather up the acceptance documents for all of the projects turned over for operations and, together with the payment documents, deliver them to the bank for payment by the customers. If this unrealistic period is not adhered to, the bank presents the total amount of credit to the contractor in the form of a penalty.

The true status of affairs is being distorted. Great differences develop between the reports for contractual work and the balance. These differences are equivalent to the value of the delivered but unpaid for commodity output. As a result, a reduction takes place in the amount of profit, the economic incentive fund decreases in value and the principle of furnishing credit for unfinished production, conditioned by the experiment itself, is disrupted. Although the finished product is at hand, it does not exist in terms of bank documents!

What must be done in order to correct this paradox? Very little. Use must be made again of the rule established originally for the Belorussian experiment, wherein the bank includes the expenses for the project delivered

in the credit extended, even if the formulation of the payment documents is somewhat overdue. A reading must be taken at the moment of actual payment for the commodity output by the customer, with a penalty in the event of a delay amounting to a raised percentage for the credit.

Or let us look at still another problem. A construction trust commenced the erection of a planned project. The plans called for it to be turned over for operation within a year's time. A definite volume of unfinished production work forms during the course of this work. The following year bank control suddenly indicates that the project is not to be accepted for financing and all of the credit issued earlier is presented in the form of a fine. In this instance it is the contractor and not the customer who suffers, despite the fact that it was the customer who failed to display concern for high quality planning-estimates documentation and the formulation of the financial and other documents. It is believed that it would be more correct, more important and more useful to present bank credit for all unfinished construction work based upon the actual turning over of the projects for operations and regardless of existing relationships between the customer and the bank.

Quite often the plan for commodity output is not fulfilled owing to the incompleteness of the technical documentation or delays in equipment deliveries. For example, at the Tosno Plant for Domestic Chemistry, new capabilities were placed in operation during the fourth quarter instead of the second, as called for in the plan. The customer was late in supplying the equipment, the builders suffered and, as a result, the trust was unable to fulfill its plan for commodity output. The mentioned fact serves to emphasize that the planning of commodity output at large construction projects having a normative duration of more than 1 year should be carried out on the basis of large-scale technological stages.

Many complications still arise owing to the fact that we still lack a single and efficient method for distributing the work volumes. More often than not the customer and contractor are guided by their own quarterly plans, which are not coordinated one with the other. It is obvious that the contractual organization should be authorized to plan the work volumes. It possesses an accurate knowledge of its own strength and potential for maneuvering material, technical and labor resources.

The effectiveness of the experiment in construction is being lowered to a considerable degree by various discrepancies. This fine undertaking requires further improvements, with all experience accumulated in actual practice being taken into account.



PROBLEMS ASSOCIATED WITH RECONSTRUCTION OF ENTERPRISES REVIEWED

Moscow EKONOMIKA STROITEL'STVA in Russian No 5, May 79 pp 18-20

[Article by I.V. Komzin, professor and director of NIIOUS of the Moscow Construction Engineering Institute imeni V.V. Kuybyshev and V.A. Bol'shakov, Candidate of Technical Sciences and department head: "Complete Solution For the Problem of Enterprise Reconstruction Required"]

[Text] During the Tenth Five-Year Plan and in subsequent years, the volume of industrial construction throughout the country will increase mainly through reconstruction and the technical re-equipping of existing enterprises. There is every basis for assuming that an acceleration of the rates for restoring industrial output, the differences in the service life of buildings and technological equipment, limitations upon new industrial construction and other factors will in future years bring about an increase in the proportion of expenditures for the reconstruction of existing enterprises within the overall volume of capital investments.

Such a trend in capital expenditures derives from the important role played by the reconstruction of existing enterprises in connection with intensifying and raising the efficiency of social production. At the same time, the rates for converting over to intensive forms for the reproduction of fixed capital are still inadequate at the present time and this is related to a number of unresolved problems.

As is well known, the carrying out of work associated with the reconstruction of existing enterprises is conditioned by a raised labor intensiveness and the complicated nature of the work, by the need for combining construction production with the technological processes of the enterprise being reorganized, by the lack of correspondence of the space-planning and structural solutions for the buildings with the parameters of the construction machines and flow-line technology for carrying out the construction-installation work and by other factors. However, the evaluation of the work of the construction organizations responsible for the reconstruction work is still being carried out based mainly upon the same criteria used for new construction.

An analysis of the results of the productive activities of such organizations has revealed a disparity between the normative base used for planning and computing the work carried out and the required expenditures for construction production.

During the course of studies carried out at NIIOUS, the deviations in actual and planned indices were measured from a quantitative standpoint. Thus it was established that the level of fulfillment by the workers of the output norms at the reconstruction facilities was lower than that achieved by the construction ministries at the end of the Ninth Five-Year Plan. The probability that this was caused by objective conditions at the construction site and not by shortcomings in the organization of construction production was  $0.9 \pm 0.95$  and this testifies to the high reliability of the results obtained.

A change in the labor intensiveness was caused by a complication in the conditions of construction production, by an increase in labor expenditures for transporting the construction materials and by a change in the structure of the construction processes, by an increase in the number of transfers of worker brigades during shifts and so forth.

In the reconstruction of existing enterprises, a considerable increase takes place in expenditures for the operation of construction machines.

This is caused by the use of construction machines having higher power ratings than those called for in the standard technological charts, by an increase in the amount of time that the machines remain at the sites owing to difficulties in moving them from one base to another and by an increase in the number of additional (not stipulated in the norms) movements and so forth.

The data obtained allows one to draw the conclusion that the inevitable additional expenditures of the construction organizations associated with the carrying out of work at the reconstruction facilities are not fully compensated by correctional coefficients for the wages and operating costs for the construction machines. Therefore an increase in the proportion of reconstruction work in the production program of construction organizations lowers the possibility of forming incentive funds and hence the interest in carrying out this work.

It is our opinion that a complex of measures must ideally be carried out in order to intensify the desire on the part of the contractual organizations to carry out reconstruction work on existing enterprises.

First of all, methods must be developed which will make it possible to furnish a quantitative evaluation of the degree of complicated conditions and the constraints existing at a construction site during the course of reconstruction work, since the existing normative documents for construction

do not permit this to be done. Thus it will become possible on this basis to review those correctional coefficients which take into account the complicated nature of construction operations during reconstruction work, compared to new construction. We are in agreement with the proposals made by Giprometz [State All-Union Institute for the Planning of Metallurgical Plants] of USSR Minchermet [Ministry of Ferrous Metallurgy] which hold that it is more suitable to employ the correctional coefficients for the estimated reconstruction costs for installations rather than for individual items of expenditure.

One method for stimulating interest in the construction organizations for carrying out reconstruction work on existing enterprises is that of authorizing the leaders of the sides to conclude contractual agreements based upon mutually agreed upon production operational conditions, estimates and obligations. In order to prevent this point from being interpreted in different ways, appropriate methodological instructions should be developed and considered mandatory for both the customers and the contractual organizations. In order to compare this document, normatives are required which will make it possible to measure from a quantitative standpoint the complicated nature of the conditions and the degree of constraints at the construction site.

Based upon proposals submitted by NIIES [Scientific Research Institute of Economics of Construction] of USSR Gosplan, it is our opinion that attention should be given to the question of additional incentives for construction organization workers, from the centralized funds of ministries and departments, for the timely and ahead-of-schedule placing in operation of reconstructed facilities. Beyond any doubt, this measure will stimulate the work of the contractual organizations at the reconstruction projects.

However, the best stimuli are found not only in the sphere of construction production. First of all, this applies to the existing system of plan normatives for construction. When planning reconstruction operations, use should not be made of the existing norms for the duration of construction, specific capital investments, stockpile and so forth, since the structure of capital expenditures and the principal parameters accepted as the basis for determining them differ considerably from those for new construction projects.

Nor can it be said that nothing is being done in this regard. TsNIIOMTP of USSR Gosstroy has developed and published "Recommendations for Determining the Duration of Reconstruction of Industrial Enterprises, Buildings and Installations" which, based upon a decision handed down by the interested ministries and departments, can be employed experimentally when preparing title lists, determining the schedules for placing production capabilities in operation and distributing the plans for capital investments by years. Our institute participated in the development of this document. These recommendations should now be approved as quickly as possible so as to ensure the confirmation in the near future of the norms for the duration of reconstruction work.



In a number of branches the reconstruction projects were taken into consideration during preparation of the normatives. However, it should be borne in mind that these normatives were developed prior to the approval by USSR Gosstroy and USSR Gosplan of the definitions for such terms as "new construction," "expansion," "reconstruction" and "technical re-equipping."

A check carried out by USSR Stroybank [All-Union Bank for the Financing of Capital Investments] during the Ninth Five-Year Plan established the fact that at 62 percent of the reconstructed enterprises an increase in output was achieved as a result of the installation of new production areas, which often increase by 4-5 times. This brought about a deterioration in the structure of fixed capital and an increase in the norms for specific capital investments. The reconstructed facilities must be analyzed thoroughly, they must be grouped in conformity with the approved definitions and subsequently corrections must be introduced into the normatives for the specific capital expenditures.

A requirement also exists for reviewing the norms for the duration of development of the reconstructed enterprises: they must be reduced substantially (by 2-3 times) compared to new enterprises and taking capabilities into consideration.

The increasing volumes of reconstruction work are also raising a problem with regard to the organizational forms for carrying out construction-installation work at existing industrial enterprises.

In examining this problem from a regional standpoint, one must be guided by the existing structure for the construction organizations. It is known that in addition to the contractual construction organizations of the construction ministries, construction subunits of branch ministries and departments are to be found in operation in each economic region. In particular, the reconstruction of enterprises may be carried out not only by contractual construction organizations but also by the repair-construction trusts of branch ministries and the construction subunits of industrial enterprises. Such organizations, which have been in operation over an extended period of time at specific branch enterprises, are fully capable, in terms of their economic indices, of competing against the contractual construction trusts and in a number of instances they even surpass them. For example, the program for the TsentrkhimremstroyMontazh Trust costs 55 million rubles. The average output per worker at these organizations is only 15 percent lower than that for contractual trusts of construction ministries, despite the fact that the nature of the work performed by them differs sharply from the conditions for new construction.

Thus the attraction on a broad scale of the repair-construction organizations of branch ministries to reconstruction work will make it possible to properly task the contractual construction trusts in conformity with their potential and this will promote improved labor productivity in construction. This will also prove to be advantageous to the repair-construction trusts, since an

increase in the reconstruction work volumes coupled with the medium and capital repair work of existing departments will promote an increase in the effectiveness of their activities. Algorithms and programs for solving such tasks have been developed at NIIOUS.

A considerable reserve for raising the operational efficiency of construction organizations engaged in the reconstruction of existing enterprises is that of improving the planning of their activities. A number of independent tasks can be solved during the planning process. This includes computing the production capability, determining the proper type and degree of specialization, tasking the primary subunits of the construction organizations and so forth.

In conformity with the manual published by the NIIES of USSR Gosstroy in 1978, the production capability of a construction organization is determined by the value of the fixed productive capital and the progressive index for capital-output ratio. As a rule, this index for reconstruction facilities is lower than that for new construction projects and the availability of funds for a construction organization is dependent upon the structure of the production program and the construction production conditions. Thus the capability is a variable quantity and in many instances it is lower than in trusts carrying out new construction work. When an increase takes place in the proportion of reconstruction work in the program of a construction organization, the capability decreases while at the same time the workload of the administrative apparatus and technical services increases considerably. In order to stimulate the activities of workers in these services, it is considered only proper to assign organizations responsible for considerable amounts of reconstruction work to the higher wage group established for leading and engineering-technical workers.

The efficiency of construction production can be raised substantially by means of increased specialization in those construction organizations carrying out reconstruction work. Studies carried out at NIIOUS have shown that when an increase takes place in the proportion of reconstruction work in a work program, a number of indices, particularly output per worker, change in different ways. The output index decreases most intensively when the volumes of reconstruction work are less than 30 percent of the overall volume of construction-installation work. A further increase in the volumes of reconstruction work will not bring about a substantial change in the level of output. This makes it possible, by means of an appropriate redistribution of the new construction and reconstruction projects among the structural subelements, to raise the labor productivity of the construction organization.

It should be borne in mind that despite the mentioned measures, the construction organizations carrying out reconstruction work will still be in worse straits in terms of a number of indices (labor, profits and others) than trusts engaged in carrying out new construction work. In such cases,

it is recommended that corrections be introduced into the planning tasks. Use can be made for this purpose of statistical models developed by the NIIOS of MISI imeni V.V. Kuybyshev and the NIIES of USSR Gosstroy.

It is not possible in just one brief article to review all of the problems associated with reconstruction work. However, it bears mentioning that a large number of publications in the periodic press indicate that the planning institutes and the subunits of construction and branch ministries have accumulated considerable reconstruction experience. However, owing to an absence of organization for directing and coordinating the work of the developers, this experience is not being summarized by anybody and, as a result, the advantages of reconstruction over new construction are not always being realized in actual practice. It is our opinion that a need exists for establishing a leading organization for examining this problem and for bearing responsibility for coordinating operations, summarizing accumulated experience and introducing the results of completed studies into the practice of reconstructing existing enterprises.

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CONCENTRATION OF CAPITAL INVESTMENTS FOR REDUCING UNFINISHED CONSTRUCTION

Moscow EKONOMIKA STROITEL'STVA in Russian No 5, May 79 pp 21-24

[Article by I.A. Titova, Candidate of Economic Sciences and head of department at the Scientific Research Institute of Economics of Construction of USSR Gosstroy: "Concentration of Capital Investments -- The Bases for Reducing the Volume of Unfinished Construction"]

[Text] The principal trends for developing the national economy of the USSR during the 1976-1980 period called for the following: "To achieve a substantial reduction in the schedules for the construction, expansion and reconstruction of enterprises and projects by means of a concentration of capital investments and material and labor resources, an increase in the level of industrialization and improvements in the organization of construction production." The above emphasizes the importance being attached to the concentration of capital investments in construction.

An analysis of the results of capital construction reveals that in many instances the duration of construction operations exceeds the specified norms, a number of capabilities and projects are not being placed in operation in accordance with the established schedules and the volume of unfinished construction is increasing.

One of the principal reasons for this is the continuing dispersion of capital investments among numerous projects that are being built simultaneously.

In a speech delivered before the November (1978) Plenum of the CC CPSU, Comrade L.I. Brezhnev stated: "Up until now, we have been unable to halt the process of dispersion of capital investments among numerous construction projects. Unfinished construction work is increasing. Uninstalled equipment valued at several billions of rubles is lying unused in warehouses. This has been mentioned on more than one occasion. But there is no indication that USSR Gosplan, the customers or the builders sense their responsibility for the immobilization of capital investments, equipment and materials." In the Decree of the Plenum, it is stated: "An irreconcilable campaign must

be waged against all incidents of forces and resources being dispersed among numerous construction projects and against increasing volumes of unfinished construction and uninstalled equipment."

Studies carried out in construction have shown that in order to raise the concentration of capital investments and, it follows, reduce the dispersion of such investments, a number of important measures must be carried out.

During the initial years following the adoption of the well known Decree No. 389 of the CC CPSU and the USSR Soviet of Ministers dated 29 May 1969, the measures called for in the decree with regard to the concentration of capital investments in construction and reducing the volume of unfinished construction, including a decrease in the number of new construction starts and observance of the construction duration schedules when planning norms, began to be carried out in an active manner. However, after the passage of several years, disruptions began to appear once again.

Compared to 1966, when the proportion of newly begun construction projects was 26 percent, by 1970 the figure had dropped to 19.5 percent of the overall volume of construction projects included in the plan. During subsequent years the proportion of these construction projects began to increase and in 1976 they amounted to 33 percent and in 1977 -- 49 percent. Based upon the existing normatives for construction starts, a normative was computed for the proportion of expenditures for newly begun construction with regard to the annual volume of capital investments, for average normative duration of construction. This normative for projects of a productive nature equalled 14 percent. However, even in 1970, when the actual proportion of expenditures for new construction projects was minimal, this index also began to increase. The concentration of capital investments is not the only measure available for bringing the proportion of expenditures at newly begun construction projects to the norm mentioned above. In order to lower substantially the volume of unfinished construction over the next few years, this norm must be lowered still further.

Despite a certain reduction in the duration of construction operations, following the adoption of the above-mentioned decree of the CC CPSU and the USSR Council of Ministers, violations of the approved norms continue to take place. Compared to 1970 when the actual duration of construction for capabilities and projects placed in operation exceeded the norm by 2.1 times, since 1972 and up until the present time it has exceeded it by 1.5-1.7 times.

As a result of the effects of the above-mentioned and also a number of other factors, the dispersion of capital investments in construction increased and this led to an increase in the volume of unfinished construction. Whereas by the end of 1971 it amounted to 74 percent of the annual volume of capital investments, compared to 80 percent in 1969, by the end of the Ninth Five-Year Plan it had once again increased to 75 percent and continues to grow.

In 1978, capabilities and projects valued at 11 billion rubles more than in 1976 were placed in operation throughout the country, with the volume of



capital investments increasing by 10 billion rubles and unfinished construction by 14 billion rubles during this same period. This implies that the placing in operation of capabilities and projects was carried out not so much by raising the readiness of unfinished construction as it was by means of capital investments in projects not associated with ensuring the placing in operation of capabilities. This is also borne out by a comparison of plan fulfillment for the placing in operation of capabilities and projects against fulfillment of the plan for introducing fixed capital into operations and also a comparison of these indices against the level of fulfillment of the plan for capital investments. The increase in the volume of unfinished construction occurred as a result of higher rates for the fulfillment of the overall capital investment plan, compared to fulfillment of the plan for placing capabilities and projects in operation.

In order to reduce the volume of unfinished construction to a norm determined to be 65 percent by 1980, specific measures must be developed and implemented for concentrating the resources and capabilities of the construction organizations mainly at construction projects in progress and at important transitional projects, so as to ensure fulfillment of the tasks for placing the capabilities and projects in operation.

The system of norms being employed at the present time for underway construction, which combines natural and cost indices, makes it possible to evaluate the situation with regard to the concentration of capital investments and unfinished construction, outline specific measures for preventing the dispersion of capital investments and creating the required amounts of underway construction and also to determine the work volumes required for fulfilling the plan for placing capabilities and projects in operation.

An analysis carried out using the indices for the construction inventory confirms that when considerable above-normal amounts of unfinished construction are present in all of the ministries and departments, the actual readiness of the construction inventory is as a rule very low. For example, according to computations by the NIIES of USSR Gosstroy, statistical accounting has revealed that the actual readiness of the construction inventory for USSR Minenergo is 1.33 times lower than the norm, for Minkhimprom (USSR Ministry of the Chemical Industry) -- 1.26 times lower. Thus the actual inventory amounts by capability types in these ministries exceed the normative indices for inventory. A comparison of these indices in terms of capability characterizes a low degree of concentration of capital investments and their dispersion among a large number of enterprises, phases, pilot complexes and projects which are under construction simultaneously and testifies to the lack of planned tasks for the placing of capabilities in operation.

Up until now, the placing of capabilities in operation has been planned mainly for the last years of the five-year plans, without taking into account the actual construction inventory and thus in many instances



no provision has been made for ensuring the availability of the inventory required for placing capabilities in operation during the next five-year period. Such a situation produces a condition wherein the ministry, instead of evaluating the reality of the planned introduction into operations of a capability and its distribution by years, increases the number of newly begun projects during the initial years of the planned five-year plan. In turn, this threatens the possibility of fulfilling the five-year plan for placing capabilities in operation and it promotes the creation of an above-normal inventory in terms of capability at the end of the five-year plan, that is, it leads to a dispersion of capital investments, a reduction in the level of readiness of the construction inventory, growth in the volume of unfinished construction and an increase in the deficit of capital investments required for completing construction projects underway during the year. At the same time, an increase takes place in the duration of construction and the possibility of commencing the construction of enterprises and projects that are truly needed by the ministry decreases. The task of achieving a solution for this problem is greatly dependent upon raising the reality of the plans and their stability.

The task of achieving the required concentration of capital investments and, it follows, a normal volume of unfinished construction, is mainly associated with improving the planning of capital construction, raising the technical level of industrial and construction production and planning and improving supply, financing, control and accounting in construction and the normative base. These problems are closely associated one with the other and they touch upon the interests of all those participating in construction -- from the moment that the idea of creating an enterprise first appears until finally the national economy begins to receive products from this enterprise.

In our opinion, planning is the principal basis for solving the problem under review. The practicality of the planned tasks, their stability, validity and good balance with all types of resources promote the carrying out of the tasks and improvements in the effectiveness of the capital investments. In connection with implementing improvements in planning, great importance is attached to the quality of the initial base and its practicality. In this regard, attention should be focused on the need for rapidly defining the volume of unfinished construction by means of inventory-taking. It bears mentioning that such inventory-taking was carried out during the Ninth Five-Year Plan in certain main administrative boards of Minkhimprom and Minchermet and yet the work was never completed.

If we analyze the age structure of unfinished construction, then the advanced "age" of a number of enterprises becomes readily apparent. Many active title lists indicate that the construction projects were begun in the 1950s and in a number of instances even in the 1940s. Thus it turns out that construction work continues on enterprises that have been in operation for a number of years, despite the fact that projects are being built which have nothing in common with construction begun in the 1940s and 1950s. On such title lists the complete estimated cost of construction for the entire

enterprise and the volume of capital investments employed are taken into account, with the new tasks for placing the capabilities and projects in operation being added to the lists. The expenses cited, particularly in the form of various prices, create inaccuracies in the volumes of the title lists of construction projects, which serve as the basis for plan comparison. This also promotes the dispersion of capital investments, since actual construction is called for in the plan in the form of transitional construction and at times in rather large amounts.

For a number of industrial and national economic branches, it is at times difficult to interpret fully the volume of unfinished construction, since as a rule approximately one third of this volume is for all practical purposes not associated with the construction inventory, nor with the placing in operation of capabilities. Difficulties are being created in this regard in planning the volumes of capital investments based upon the norms for construction duration and inventory. Capital investments are quite often allocated in considerably smaller volumes than called for in the norms and the schedules for placing the capabilities in operation differ from the norms.

In order to ensure a proper concentration of capital investments and the creation of a sound base for planning, the structure of the construction phases and pilot complexes must be defined in an efficient manner in the planning documentation.

Discrepancies encountered in the composition and list of pilot complex projects, as called for in the planning documentation, title lists and intra-building title lists, lower the degree of validity and stability of the work plans. The ministries and departments -- the customers and contractual construction organizations -- for all practical purposes do not have, even during the start-up year, an efficient work plan for determining the sequence for the fulfillment and placing in operation of pilot complexes and enterprises on the whole. This lowers the practicality of fulfillment of the planned tasks for placing capabilities in operation.

The dispersion of capital investments and growth in the volume of unfinished construction work are also taking place owing to an absence of balance in the plans for capital investments and the plans for developing the capabilities of the construction organizations. The inclusion of a new construction project in the work plan often produces a situation wherein a construction organization possessing the required production base and capable of performing the planned volume of work is lacking at the site at the commencement of work. The same situation develops in those instances when the board of directors of an enterprise under construction and the construction organizations, for various reasons, call for the simultaneous commencement of installation work on a large number of projects and this results, even during the first year of construction, in the creation of above-normal volumes of unfinished construction.

In addition to being solved at the USSR Gosplan level and the ministry and departmental levels, the problem of concentration of capital investments must also be solved to a considerable degree at the level of the customer-enterprises and contractual trusts or even the primary construction organizations.

The dispersion of capital investments brings about a halt in production operations at a number of construction projects and installations. During the last 3 years of the five-year plan, the number of such construction projects increased throughout the country. Each industrial ministry and department has a so-called concealed conservation of projects having differing degrees of readiness and involved at various times in construction and conservation. At times and over a period of several years, projects the construction of which was begun separately are not being included in the intra-building title lists. Subsequently they appear with a changed estimated cost and following this they are included in the accounting procedures. Such a possibility of holding projects and the expenses for them in unfinished construction appears as a rule in the case of "old" construction projects, as already mentioned above. The concealed conservation of projects at construction sites brings about considerable changes in the estimated cost of construction of projects by years and distortions in the level of readiness of pilot complexes, in the structure of which they are included. All of this results in mistakes being made when determining the planned volumes of work for the following years.

This type of situation at a number of enterprises is resulting in failure to coordinate the readiness schedules of the projects for equipment installation with the schedules for equipment deliveries. As a result, there have been many instances of equipment, following its delivery, lying for extended periods of time in warehouses awaiting installation. During the past few years an increase has taken place in the volume of uninstalled equipment in customer warehouses.

In addition to inaccuracies in existing pilot complexes, the dispersion of capital investments in construction is also being adversely affected by the absence of proper coordination between the plans for capital investments and planning-research work. As the proportion of expenses for planning-research work, with regard to the capital investment volume, has increased from 2 to 2.2 percent during the last 7 years, their proportion of the volume of unfinished construction has increased from 7.6 to 8.8 percent.

Each year the planning organizations over-fulfill their work plans despite relatively frequent defects in the planning-estimates documentation for construction. The absence of proper coordination for the mentioned plans leads to a situation wherein the planning documentation is not developed in the required sequence, as called for in the title lists. In addition, it is delivered to the construction projects in an untimely and incomplete manner and this precludes the possibility of completing individual units and work at the projects in a timely manner.

The achieving of the established norm for volume of unfinished construction promotes rhythmic work by the construction organizations and uniformity in the placing in operation of capacities and projects. However, during the past few years the annual plans called for approximately one half of the pilot capabilities and projects to be placed in operation during the fourth quarter and the largest portion -- in December. This affected to a considerable degree the increase in the volume of unfinished construction during the past 3 years of the five-year plan. It should also be pointed out that the tasks for placing capabilities, projects and volumes of capital investments in operation, as called for in the five-year plans, are as a rule not being carried forward in the respective annual plans. For example, last year the task of placing capabilities in operation at a number of ministries and departments was reduced in the approved annual plan and with fewer changes in the volumes of capital investments. As a result of refinements in the results of plan fulfillment for the preceding year and additional changes associated with the inclusion of new construction projects and installations, considerable changes were once again introduced into the planning tasks. Although all of these changes were valid, they nevertheless created additional difficulties with regard to plan fulfillment and they failed to promote the elimination of existing shortcomings. It is our opinion that the five-year and annual plans could have been more stable if, in addition to removing the mentioned shortcomings, the planning was carried out not solely on the basis of the planning tasks but rather taking into account a reliable evaluation of the results of plan fulfillment for the previous period.

The concentration of capital investments and the achieving of a normal volume of unfinished construction must promote the conversion over to planning and evaluating the activities of all those participating in the construction process, for pilot complexes completed and turned over for operation and projects prepared for the production of goods and the rendering of services. However, the continuing high volumes of computations for work stages and the shortcomings in defining the pilot complexes have produced a situation wherein the introduction of computations for finished construction products is still not focusing proper attention on the concentration of capital investments and reductions in the volumes of unfinished construction.

A reserve for implementing a concentration of capital investments is that of raising the scientific validity of the normative base for construction and to this end principles must also be developed for creating a system of norms for use in the automation of planning computations and thus raising in this manner the validity of the plan.

Following an extended study of the problem of inventories in construction, the NIIES of USSR Gosstroy has proposed that the index for expenditures for completing construction work be included among the planned and approved indices and that the index for unfinished construction, which is not directly associated with the placing in operation of capabilities and fixed capital, be replaced gradually. The indices for inventory capability and

readiness of the construction inventory should be added to the index for the completion of construction work. Such a combination of indices makes it possible to evaluate more correctly the status of concentration of capital investments and inventories in construction. In this regard, it has been proposed that the principles for continuous planning of capital investments be developed based upon inventory norms not only in residential housing but also in industrial construction. This should be predicated upon completeness in the carrying out of construction work and upon speed in the engineering preparation of a territory. This must serve to retard seriously the dispersion of capital investments.

Ideally the ministries and departments should carry out a careful check on the title lists of the construction projects, reprocess the planning-estimates documentation, take into account the true status of construction, determine the construction priorities and structure of the pilot complexes and indicate their production capabilities and estimated costs. The customer-enterprises and the managements of the enterprises under construction, jointly with the planning organizations, can simultaneously re-examine the intra-building title lists while devoting special attention to those projects the construction of which was commenced earlier. This will make it possible to complete the latter projects in the immediate future and to ensure normal operations for existing enterprises and newly introduced pilot complexes.

A large reserve for eliminating the dispersion of capital investments is that of converting over to computing the final construction product, fully eliminating the computations by stages and projects, providing the projects were not intended for the production of products or the rendering of services. This requires the development of a system of incentives for all those participating in the construction process, in accordance with a single index for the final construction product.

A concentration of capital investments, which is the foundation for reducing the volume of unfinished construction, can be implemented at construction projects throughout the country if all organizations participating in capital construction devote appropriate attention to this problem.

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## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### OREL CONTINUOUS PLANNING SYSTEM FOR RURAL CONSTRUCTION PROJECTS

Moscow STROITEL'NAYA GAZETA in Russian 1 Jun 79 p 2

[Article by S. Dement'yev, Deputy Chairman of RSFSR Gosstroy: "The Customer Is Slowing Down the Work"]

[Text] In this present article, I would like to touch upon many problems the solving of which is dependent upon the development of progress in agriculture. But there is one problem which I, as a specialist, have worked upon and been particularly concerned about during the past few years and which has become an object of serious discussion both in the press and at important meetings. I have in mind the introduction of the Orel system of "continuous planning" in rural construction and particularly in the non-chernozem zone of the RSFSR.

During the past years of the Tenth Five-Year Plan, the builders in the non-chernozem zone accomplished a great deal with regard to the development of agricultural production. But there are still many difficulties and shortcomings associated mainly with the increasing volume of unfinished construction. Specific and efficient measures are required for accelerating the placing in operation of production installations, dwellings and cultural-domestic buildings and raising the efficiency of capital investments. In my opinion, one important measure is the mass introduction into rural construction of the Orel system of "continuous planning."

In the interest of furnishing a clear picture as to the economic and social effects of this method (the residents of Orel refer to it as a planning-construction production line), we will mention its principal components. This production line operates throughout the entire city. Here we find a single customer, a single planner and a single builder. The tasks are established based upon five-year plans for capital investments and a general plan for the development of the city. The construction is organized based upon the principle of continuous planning over a period of 2 years: the first year is viewed as a working year and is not subject to changes and the second year -- as a preparatory one in which construction is underway and during which certain minor corrections are acceptable. Unfinished projects from



the previous year are included in the future plan, with the required number of new projects being added to them and with a new working plan being formulated. Thus the Orel workers acquired a continuous rhythm without additional capital investments or logistical resources and under the usual production conditions. This experience was approved by the CC CPSU and is already being employed in many cities throughout the country.

The use of the Orel system of "continuous planning" at rural construction projects is of great importance. This is true first of all because the program for developing the rural areas, including the non-chernozem zone, is large-scale and long-term in nature. Today's practice indicates that annual calendar planning for a continuous construction process is in conflict with the continuous nature of planning itself. By restricting the construction process to small annual calendar periods, we are in fact planning anew for each year. As a result, the organizational basis for construction production is inevitably disrupted and thereafter the internal sequence of operations is impeded.

As is apparent, the system of "continuous planning" is an organizational form of construction having economic and social criteria. Actually, during the carrying out of the experiment, it was necessary to take into account the specific working conditions of the rural builders and particularly: the scattered nature of the installations erected and their locations at considerable distances from bases of the construction industry. Yes and the roads connecting them were far from smooth, to say the least. The work was also complicated by a large nomenclature and by a large number of buildings erected. In addition, the construction of rural projects is financed on the basis of two sources: state and kolkhoz resources. It should be borne in mind that the Orel method must be employed not only for the construction of housing and cultural-domestic buildings but also for installations of a production nature.

During an RSFSR Gosstroy conference, it was recommended that the RSFSR Ministry of Agriculture create a service of individual customers in the rural areas, with the proposals being received from the Orlovskaya, Tul'skaya and Sverdlovskaya oblast executive committees being taken into account. The RSFSR Ministry of Agriculture should have provided the contractual construction organizations with title lists for their projects in a timely manner and also the required technical documentation. Appropriate recommendations for the introduction of the Orel system of "continuous planning" were in fact issued to the contractual construction ministries and departments and also to the oblast executive committees.

The general customer for the overwhelming majority of the projects -- the RSFSR Ministry of Agriculture -- should logically have been the interested party with regard to the carrying out of the experiment. Actually, the ministry's workers are still acting in an extremely passive manner. Although nobody objected to the proposal made 2 years ago by RSFSR Gosstroy for one

customer in the ministry, still no practical steps have been taken in the interest of approving it. As a result, that portion of the work which predetermines to a considerable degree the success of an experiment was not carried out.

The most important document was not approved -- the statute concerning a single customer -- which should have set forth his economic activities and the inter-relationships with those establishments which provide appropriations for construction and also the tables of organization and wages for specialists, a point which is of considerable importance with regard to retaining experienced personnel. Those as yet unresolved problems which fall within the competence of the general customer and which concern the turning over to the construction ministries and departments of capital construction plans for 2 years for the various projects have become stumbling blocks. This derives from the fact that no long-range and complex plans are available for the proportional branch development of establishments, rayons and oblasts. Indeed the requirement for such planning derives directly from the decree of the CC CPSU and the USSR Council of Ministers concerning the non-chernozem zone.

In January 1979, USSR Goshank defined the system to be followed for the concentration of resources and for construction at sovkhozes, with the financing being carried out by means of state capital investments. It was for these reasons that the technical-economic results expected for the last year of the experiment were not achieved.

Could it be that not one single "plus" was produced by the experiment? No, it is obvious that other changes took place in addition to the pages of the calendar. For example, a standardization of buildings and installations took place in Orlovskaya Oblast, new plans embodying high technical-economic indices were developed, products and structures were standardized and so forth. Plans were developed for new dwellings, social-cultural installations and sectional units based upon the "121" and "26" series.

The experimental construction confirmed the high level of industrialization and the possibility of improving the technical-economic indices for residential housing construction in the rural areas. Deserving of attention is the extensive dissemination of the experience accumulated at the Oreisul'khozmontazhkomplekt Production Association. The workshop at its Seminarskiy Branch is equipped with technological lines that are operated by highly skilled specialists. This has made it possible to transfer 40 percent of the entire volume of installation work to the workshop and to organize there the production of all units and the assembly and breaking in of the equipment.

We are clearly aware of the raised professional and public interest being displayed in the introduction of the "continuous planning" system at rural construction projects and the advantages being realized from this method. An interdepartmental coordination council for the introduction of the

"continuous planning" system on a broader scale is being created at RSFSR Gosstroy. Proposals received from the various areas were reviewed at the end of last year and recommendations were made on the nature of the preparatory work to be carried out in connection with the introduction, during 1979, of 2-year planning in rural construction in 18 more autonomous republics, krais and oblasts of the Russian Federation. Included among them are the Mari and Mordovian ASSR's, Moscow, Leningrad and Ryazanskaya oblasts and others.

Just as in the past, the responsibility lies with the RSFSR Ministry of Agriculture. It must accelerate the creation of united boards of directors and the centralization of their capital investment accounts and it must prepare and issue to the contractors 2-year title lists for the various projects. Moreover, it must not be forgotten that time passes by very quickly. Thus the customer must monitor its passage and ensure that he is not overtaken by events. Our task consists of ensuring that this present year serves as a starting platform for the mass introduction of the Orel system of "continuous planning" in rural construction in the non-chernozem zone.

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CSO: 1821

## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### EFFECT OF MODERNIZING INDUSTRIAL ENTERPRISES

Moscow STROITEL'NAYA GAZETA in Russian 18 May 79 p 1

[Editorial: "Effects of Modernization"]

[Text] In the last three years, Moscow's industry manufactured as many products as in the entire Eighth Five-Year Plan period and overfulfilled considerably the tasks for increasing the volume of production. For a long time now there have been no enterprises in the capital that have not coped with their annual plans. The decisive factor in achieving such marked successes was the consistent line on modernizing and reequipping existing enterprises.

Never before has Moscow industry known such rates. Never have such extensive qualitative changes been observed. The capital-labor ratio increased by 20 percent and the power-labor ratio -- by 10 percent.

An increase in the efficiency of social production is the main direction of further development of our economy. In the eighties, stated Comrade L. I. Brezhnev at the 25th party congress, "the solution of this problem becomes especially urgent. This is connected, first of all, to the labor resources problem which is becoming more acute. We will have to rely not on attracting additional labor forces, but also on raising the productivity of labor. A sharp decrease in the ratio of manual labor and comprehensive mechanization and automation are becoming the necessary conditions for economic growth."

The experience of Moscow, Leningrad, the Sverdlovskaya and Zaporozhskaya oblasts proves convincingly that modernization, expansion and reequipping of existing enterprises is the proper road to solving the problem. For example, in the Zaporozhskaya Oblast, in three years of the five-year plan period, several hundred automatic and other new lines were put in operation, about 150 shops and sections were comprehensively mechanized and over 3000 new technological processes introduced. The economic effect amounted to about 120 million rubles and the production cost of products was reduced considerably. Some 15,000 workers were freed and labor conditions were improved for 22,000 workers.

By concentrating their forces and money on decisive directions of technical progress, many plant collectives and construction and installation organizations are improving production successfully and are implementing modernization plans efficiently. Without doubt, their experience merits the most thorough study, wide support and dissemination.

It is well known that modernization and reequipment are economically more profitable than new construction. Therefore, this year it is planned to direct 60 percent of the total volume of capital investments, allotted for production facilities, to modernizing industrial enterprises. This will provide an increase in capacities with the least expenditures in a shorter time.

However, several ministries, especially those of ferrous metallurgy and the gas industry, are not fulfilling the plans for reequipment and modernization, do not assimilate the allotted money, and prolong construction times intolerably. It is significant that in the plans of the construction ministries and departments modernization is not an individual item. It is, therefore, not by accident that the volume of modernization work does not exceed 25 to 30 percent of the total volume.

The party and the government are creating all the necessary conditions for renovating the equipment bases of plants and factories. But, as already noted above, these conditions are being poorly utilized. This applies equally to practically all industries of the national economy. Thus, the ratio of manual labor at brick factories of the USSR Ministry-materialov [Ministry of Construction Materials] is high. But instead of modernizing on a broad front, the ministry is putting money into new enterprises. It is quite obvious that in such cases, the USSR Gosplan should interfere actively.

Certain planning and supply shortcomings open up to construction ministries the possibility of maneuvering and refusing to modernize in favor of more profitable new construction. As a rule, an unbalanced too large plan leads to the disruption of proportions and makes it possible to select the most profitable work. Construction ministries use this possibility widely because modernization brings them direct losses, although it may be profitable to the customer.

The situation is that enterprise modernization is identified with new construction by inertia. This is entirely wrong. At existing enterprises, the work must be done at close quarters. It is impossible to utilize equipment efficiently and organize the sites for consolidating structures and equipment. The work front is also very limited. Removing old buildings and strengthening the load-bearing structures require considerable expenditures. All of this must be done manually. Builders are justified in presenting claims to scientists and designers to create

efficient machines, devices and various contrivances that could be utilized under conditions of existing enterprises, since the volume of modernization will increase from year to year.

The productivity of labor of builders in modernizing is two to three times lower than in new construction and the amount of labor is greater by half. For a long time, builders asked central departments to develop a norm base for modernizing that would reflect actual expenditures. They propose that in this case there be as a basis the regulation and norms used by repair-construction organizations which have higher wage and lower output norms. The introduction of such norms would stimulate the desire to modernize.

Expenditures of money allotted for modernization and reequipment should also be monitored more strictly. Frequently new construction is being done under the pretext of modernization and old shops are not modernized. On the other hand, plants sometimes increase capacities under the pretext of capital repairs, which is particularly characteristic of the USSR Minmontashpertsstroy (Ministry of Installation and Special Construction). Obviously, when planning, a clear-cut differentiation should be made between all kinds of work and then should be placed in those divisions of the program where they belong.

It is necessary that designers change their attitude toward modernization. They frequently issue documentation without taking into account the concrete conditions of an existing enterprise.

Success in modernization depends to a great extent on smooth interaction between designers, equipment suppliers, builders and customers. Regrettably, it must be stated that the ties between them leave much to be desired. This means that it is necessary to develop competition on the principle of a working relay race."

In the fourth year of the five-year plan, it will be necessary to increase production considerably in all sectors of the national economy. Modernizing enterprises on the basis of scientific technical progress is one of the main ways to this goal.



## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### CREATION OF CONSTRUCTION ENTERPRISES IN THE NONCHERNOZEM REGION DELAYED

Moscow STROITEL'NAYA GAZETA in Russian 18 May 79 p 2

[Article by an O' server: "A Base First of All"]

[Text] The transformation of the Nonchernozem region is one of the large scale and urgent comprehensive programs of the agrarian policy of our party. It specifies an accelerated increase in capacities of construction organizations. In accordance with the decree of the CC CPSU and the USSR Council of Ministers "On urgent measures for creating important enterprises of a production base for construction in agricultural areas of the RSFSR Nonchernozem region", there must be erected here during the five-year plan period 70 large enterprises for manufacturing progressive structures and materials, 67 of which must be put in operation. The output of the new plants will facilitate the conversion of construction sites into places for assembling buildings and structures.

The results of three years of the five-year plan period, however, attest to the fact that established tasks are not being implemented to the full extent. Of the indicated number of enterprises, only 46 are being built and only eight were put in operation. Capacities for the production of prefabricated reinforced concrete were to be increased during the five-year plan period by 1,835,000 cubic meters, while the expected capacity to be put in operation in four years is 744,000 cubic meters; similarly planned capacity of large home-building panels -- a total area of 1,033,000 square meters but only 274,000 square meters of area will be built; of planned structures for production buildings of 600,000 square meters only half of the capacities will be put in operation. As we see the lag is too great.

The USSR Minsel'stroy [Ministry of Agricultural Construction] subdivisions are vitally interested in increasing the capacities of the industrial base, since they are the largest contractors building up the Nechernozem villages. For them, industrial methods mean not only a reduction in labor and dealing with labor scarcity, but also the stability of the production cycles.

How are they utilizing the financial and material-equipment resources allotted for that purpose? Of the 18 enterprises, they planned for the first three years of the five-year plan period, 14 enterprises were started. Of ten high priority facilities, five were released for operation.

Of special concern is the construction of enterprises for making industrial structures. In three years, construction for making 132,000 cubic meters of prefabricated reinforced concrete was to be put in operation. Two enterprises with a capacity of 57,000 cubic meters were released for operation. 38 enterprises for large home-building panels and structures for production construction were put in operation, although the plans were substantial. A number of facilities, including a shop for precast structures in Vladimirskaya Oblast, and asbestos-cement panels plants in the Tcheboksary and Nizhnyaya were not even started.

What are the basic reasons for the lag? Here we are up against a problem which has become more acute in recent years. We are talking about the poor engineering preparation for construction: TEO [Technical and economic substantiation] not developed; the production poorly organized; provision of construction sites with material-equipment and labor resources not organized properly.

As far as the land-improvement people are concerned, they place great hopes on the 18 enterprises involved in the construction of the Chuvsternozem-vodstroy. Regrettably, the progress of the work on them causes great concern. The USSR Ministry of Construction, the USSR Ministry of Heavy Industrial Construction, the USSR Ministry of Industrial Construction, and the USSR Ministry of Management. How are we fulfilling the plans for the three years of the construction of these bases. And, strange as it may seem, the situation of the construction of the USSR Ministry.

Unprejudicedly at the start of construction is the fact that concluding contracts between the different and industrial factions boil around the actual plan. Various and variations of the tasks of the five-year plans. Contractors, claiming big money of fulfillment, try to obtain smaller plans and customers try to get big money. This is confirmed by figures. For an estimated cost of construction-installation bases of the Chuvsternozem-vodstroy, 1.5 billion rubles, the USSR Ministry plan to 1991-1995, 1.5 billion rubles during the five-year plan period. In 1990, the construction of the bases is becoming oriented in reducing the cost of work. But as for home-building, a reduced plan is a cover-up of shortcomings in machinery benefits. This is what happened in the construction of the plant in Vladimirskaya Oblast. Here the master plan was overfulfilled last year. However, if construction proceeds at this rate, the work on the plant should be expected beyond the five-year plan period.

Requests for correcting the plan on the side of reducing it should be refused. The plan is a law and each collective from the brigade to the ministry should abide by it strictly.

The increase in the rate of technical progress in agricultural construction depends on the scale of the use of asbestos-cement products -- panels and large-size sheets. They provide a greater degree of prefabrication, a reduction in the amount of material used, the weight of the buildings and transportation costs. But here also the situation is not good. This year it was necessary to put in operation the Savinskiy Plant for making pressed large-size asbestos-cement sheets with a capacity of 30 million conventional plates. In spite of the approved technical documentation, the construction of this enterprise was started neither last year nor this year. The start-up of a plant of the same capacity at the Sukholozhskiy Combine was moved up by a year. The design of the Lipetskiy Plant of Asbestos-Cement Products was stopped. In a word, of the capacities planned for production in the five-year plan, 890,000 square meters of asbestos-cement panels, it is proposed in the four years to complete capacities for 400,000 panels and asbestos-cement sheets -- 30.5 million conventional plates instead of 90 million plates.

The lag in increasing capacities for making asbestos-cement structures and products is frequently excused by the objective difficulties of a big job. How simple it is! It seems as though failures were envisaged beforehand.

Rural builders feel an acute shortage of crushed stone and porous fillers for concrete and reinforced concrete structures. There is no doubt of the complexity in solving this problem, but the prospects are good -- the five-year plan for the Nечернозем region specifies the putting in operation of capacities for making 1,700,000 cubic meters of porous fillers and 5,615,000 cubic meters of crushed stone. Needless to say, this will improve the situation greatly. But the program set is not being fulfilled. For example, the USSR Minstroyaterialov [Ministry of Construction Materials] did not start the construction on time of the Chusovskiy Crushing-Sorting Plant for 900,000 cubic meters of crushed stone per year. The reason is the limited reserves and low quality of raw materials at the "Kholodnyy Klyuch" deposit. But even though this happened, the workers of the ministry should have dropped the previous decision and adopted a new one. Also the ministry did not start building a keramzit gravel plant at Izhevsk which should have been put in operation in 1978.

Facts of this kind are not singular. The USSR Minpromstroy did not start building its own plant for making 200,000 cubic meters of clay-ash keramzit in the Tul'skaya Oblast although it should have put in in operation in 1978. The USSR Minenergo [Ministry of Power and Electrification] did not put in operation on time a crushing-sorting plant for producing 970,000 cubic meters of crushed stone in the Leningradskaya Oblast. The Mintransstroy [Ministry of Transportation Construction] is slowly building a plant for producing 850,000 cubic meters of crushed stone in the Permskaya Oblast.

Foresee everything and fulfill on schedule! -- this must be the priority in all jobs of participants in developing the construction industry base in the Nonchernozem region. Much depends today on what we, in evaluating the difficulties in creating a construction industry base in the region, will be able to provide with maximum intensity at the construction sites and concentrate material-equipment and labor resources on high priority facilities. This is imperatively demanded by the scale of reconstruction of the ancient Russian earth.

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CSO: 1811

## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### HOUSING AND SOCIAL-CULTURAL CONSTRUCTION IN THE UKRAINE

Kiev RABOCHAYA GAZETA in Russian 8 May 79 p 1

[Article by G. Sushchenko: "Construction Is Strongly Regular"]

[Text] Collectives of construction organizations which erect housings and social-cultural facilities adopted responsible obligations. They decided to fulfill the annual plan ahead of schedule and build 68 percent of the housing according to improved typical designs of a new series and to complete the planned program for releasing for operation the general education schools by 1 September.

First, about housing construction. While capital investments were assimilated fully and plans for putting housing in operation for the first quarter were fulfilled in the Donetskaya, Dnepropetrovskaya, Voroshilov-gratskaya, Ivano-Frankovskaya, Poltavskaya and Khar'kovskaya oblasts, they cannot brag about any satisfactory indicators.

The situation with housing construction is better than in the first quarter of last year in the Ukrainian SSR Mintyazhstroy [Ministry of Heavy Construction]. Of 12 combines, only one could not cope with the task--the "Dneprot-yazhstroy." During January-March, this ministry assimilated 19 percent of the annual task on putting facilities in operation which will provide for regularity of construction in the following months.

The Ukrainian SSR Minpromstroy [Ministry of Industrial Construction], in spite of overfulfilling the quarterly plan for completing housing, had a shortfall of about 19 million rubles. Among the lagging ones are: the Glavl'voypromstroy and the Krymstroy and Khmel'nic'kpromstroy combines. Such organizations as the Ternopol'skoye Construction Administration, the "Zakarpatsstroy" and "Chernovitsstroy" trusts did not even release one square meter of housing for occupancy.

In a number of cases, housing cannot be occupied due to small omissions, incomplete finishing of individual items and amenities. The reason for this--the poorly organized standard of production.

In the Ukrainian Ministry of Agriculture [Agricultural Reconstruction] such trusts as the "Vinnitsa" trust, "Zaporozhzhya" trust, "Mykolaivskiy," "Zakarpattia" trust and a number of others have actually gathered the necessary investments. In the first three months, the Ministry completed less than seven percent of the small-scale construction program. Thus, the basic load will fall on the second and third quarters.

In recent years, the plans for building children's preschool establishments in the republic have been fulfilled successfully. Alongside the Nikolayevskaya, Voroshilovgradskaya and Kirovogradskaya oblasts, in which kindergartens and nurseries were released for operation above the plan, the lowest assimilation indicators (from 32 to 47 percent) are in Zaporozhskaya Oblast and in Mykolaivskiy. This is also the fault of the customers—the republics of the USSR Ministry of Education did not create technological standards in time.

The plan for building schools was fulfilled in the Mykolaivskiy and Kirovogradskiy trusts but the Ukrainian Ministry of Education and Science had a 2.2 million rubles shortfall in construction expenditures. The Kevenskaya, Sumskaya, Kharuskaya, Ternopol'skaya, and Cherkasskaya oblasts are among the lagging ones.

The most unfavorable situation is at many construction sites of trade-technical schools. This construction is going very badly in the Nikolayevskaya, Dnepropetrovskaya, Kerkenskaya, Kirovogradskaya and Krymskaya oblasts. In spite of the fact that the Ministry of Education is fulfilling plans successfully, the Ministry of Heavy Metal Industry of Ukraine, the Glavplombingstroy, the Ministry of Industry of Ukraine, the Ministry of Transportation—As and the Ministry of Communications, Ministry of Metallurgy and Special Construction work—do not create the necessary complexity of trade-technical schools, do not give the necessary and contracts construction materials and equipment to such up to the line.

The Ministry of Education must do more work on building hospitals in the republic and fulfill the plan for the construction of kindergartens, in the Mykolaivskiy, Kerkenskaya, Ternopol'skaya, and Sumskaya, Dnepropetrovskaya and Zaporozhskaya trusts. The plan for the construction of the children's hospitals must be fulfilled by the Ukrainian Ministry of Education.

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The questions of improving the quality of housing and municipal construction and following the established order for accepting and operating housing and social-cultural establishments absolutely must be given special attention by the party. Soviet organs, construction trusts and administrations, customer organizations, architectural-construction monitoring inspectors and government acceptance commissions. It is necessary to make much stronger demands on managers who produce poor quality construction. Regrettably, a number of construction organizations do not value their trademark and show no concern about the good and excellent quality of their products. Such examples exist in the Vinnitskaya, Rovenskaya and L'vovskaya oblast.

In Vinnitsa and Mogilev-Podol'sk (Comrade Krylach, chief of the "Vinnitspromstroy") six homes with a total area of about 23,000 square meters were released for occupancy in 1978, which violated the established order. In January, in four of them, work continued on laying floors, hanging wallpaper, painting panels, carpentry products and installing sanitary facilities. In Mogilev-Podol'sk, two houses which had no gas supplies or sewers, were accepted in June and September of last year.

The construction quality from the Glavl'vovpromstroy has deteriorated. While in 1977 it released 25 percent of the housing with satisfactory evaluation, in 1978--14 percent. In L'vov, in apartment house No 10 in the Fifth Yuzhovy microregion, wallpaper fell away from the walls in many apartments and the oil paint peeled.

Summer months are the most important period for builders. Taking into account the sad experience of past summers, leading to "feverish work" at the end of the year, stretching out norm schedules, reducing quality and increasing production costs, contractor construction organizations, ministries and departments, ispolkoms of oblast Soviets of People's Deputies must take immediate measures for providing regular operation in construction and for fulfilling the planned tasks on building housing, schools, preschool establishments, hospitals and technical-trade schools.

Joint purposeful work on the part of builders, customer organizations, party and trade union organizations, directed toward fulfilling the plan and the socialist obligations adopted by construction collectives for the fourth year of the five-year plan period,--that is a pledge of success in this important section of construction.

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CSO: 1821

## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### HOUSING CONSTRUCTION ON THE VOLGA'S LEFT BANK AT UL'YANOVSK

Moscow IZVESTIYA in Russian 15 May 74 p. 1

[Article by Zh. Mindubayev (Ul'yanevsk): "Streets Near Volga"]

[Text] Was it so long ago that the left bank of Volga at Ul'yanevsk was quiet and inconspicuous? Single-story houses stretched out one after the other forming a plain village with dusty streets. Peace and harmony. It seemed that many decades would pass before anything changed here.

But only two years passed. And what changes have occurred? Not very long ago at the entrance to the village, motor vehicles waited half an hour in front of RR crossing gates. Now at one stroke, we fly over the trains traveling below us on a concrete bridge a good 100 meters long. A new road,

Single-story houses stretched along the road, but now light nine-story houses stand shoulder-to-shoulder with large windows, wide balconies and TV antennas on the roofs. New houses are being erected beside them. Here are all the signs of big construction: tens of tower cranes, the roar of panel carriers and the rattle of machines driving piles.

"We are erecting a microdistrict for 150,000 persons," stated V. Yarosh, chief engineer of the Ul'yanevsk House Building Combine. "While last year we released 75,000 square meters of housing, this year it will be triple that. All buildings have bare stairs and are of a new series with improved layout of the apartments. Starting in 1980 we will begin building 12 to 14 story buildings."

A beautiful site was selected for the microdistrict. A high bank of the river, coniferous woods nearby, sandy Volga beaches. Maximum comforts are planned for the new settlement. There will be sporting areas and bicycle paths and parks for walks and rest. Wide stairs will lead the new inhabitants from the central highway to the river.

But today the number one problem is housing. Therefore, the second home-building combine (SK) is being built at an accelerated rate. This is shock goal for the city.

The DSK is being built not only by the Ul'yanovsk builders. People from many cities have come here, including those who in their time built the Volga and Kama motor vehicle plants.

At the construction sites they try to gain not only days and weeks when erecting individual facilities. It was decided to put in operation the first stage of the house-building combine a whole year ahead of schedule. Without the advanced completion of housing, without living and working conditions for thousands of people, the construction schedules of the most important production facilities would be delayed.

It is obvious that the creation of large production facility one whole year ahead of the plan is not a simple matter. The industrial enterprises of the city became the patrons of the new construction site. A schedule was prepared for a clear-cut interrelations between all subdivisions of the construction conveyor. The Ul'yanovsk obkom of the party constantly monitoring its implementation.

It was necessary to solve hundreds of different problems. For example, one of the basic problems was where and how to place the orders for manufacturing ahead of schedule a great number of equipment and non-standard equipment for the DSK. On the appeal of the party obkom, tens of enterprises in the city and oblast adopted obligations to make them on their own production areas, using for this purpose not only funded materials, but also saved money and resources. This valuable local initiative produced remarkable results.

All the increased plans for the construction-installation work of last year were completed successfully. Some 200,000 rubles above the goal were assimilated by the builders. The results for the first quarter of this year are no worse: the erection of the main buildings of the combine and utility lines are being completed. The equipment is being installed. The builders plan to start adjusting and testing it in the second quarter. They are firmly convinced that by the end of this year, the new DSK will be put in operation. This will make it possible to accelerate the entire course of construction work in the new district of the native city of Il'ich.

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## CONSTRUCTION, CONSTRUCTION MACHINERY AND BUILDING MATERIALS

### POOR QUALITY HOUSING IN ORDZHONIKIDZE

MOSCOW SOTSIALISTICHESKAYA INZHENERIYA in Russian 6 Apr 76 p 2

[Article by A. Yuslin, KPK (Communist Party of Kazakhstan) instructor at CC CPSU: "In an Atmosphere of Connivance"]

[Text] The party and Soviet organs of the North-Osetinskaya ASSR gets many complaints on the low quality of housing and municipal facilities in Ordzhonikidze, the capital of the republic, and the unprincipled position of the government receiving construction that averages these facilities which have a great number of omissions and incomplete layouts and amenities of the grounds around them. Over 100 such letters were received by the editor of the SOTSIALISTICHESKAYA INZHENERIYA, the republic newspaper, last year alone. These writers complain about the low quality of the finishing work, sanitary engineering and other work and that new tenants must spend sometimes years (!) on the doorsteps of various organizations trying to get the builders to remedy the faults.

Meanwhile, well-being reigns in the reports of the construction organizations: in 11 months of last year, for example, about 80 percent of the housing and municipal facilities were finished with a "good" evaluation.

What is the reason for the low quality of construction and why was such an unobjective statistic possible? We will say right out that this is done primarily because managers of construction organizations and especially of the "Sevostinpromstroy" (leading construction organization in Ordzhonikidze), monitored poorly the quality of construction-installation in subordinate organizations and reconciled themselves to violations of construction norms and regulations. Also, they did not make the proper demands of officials who permitted distortions in accounting, additions, omissions and faulty work. In 1978, the organizations of this administration allowed additions in the volume and cost of work for building housing and cultural-permanent welfare facilities to an amount of over 260,000 rubles. The overpaying on work alone for the last three years (to remove omissions and defects) was over 300,000 rubles.

One reason for these outrages is the completion of the basic volume of housing (50 to 60 percent), as a rule, by the end of the year which unavoidably generates crash work and reflects negatively on the quality of the construction-installation acceptance.

But is the government acceptance commission headed by chairman E. Tsomartov not familiar with the established order of accepting completed construction of housing and municipal facilities for operation? Yes, he is familiar with it. Then perhaps Comrade Tsomartov does not know that the demands of this order, which the commission must follow, is being constantly and crudely violated? But no, knowingly he himself signed acts that did not correspond to fact. But then how can one explain the fact that the housing was receiving, as a rule, good evaluations, if not by lack of principles and irresponsibility of the members of the commission and its chairman? The connivance of the commission which not even once demanded the punishment of the wrongdoers was taken by the latter as a silent agreement with the established practice. And not without the help of the commission they frequently received weighty bonuses for their "work."

Lack of monitoring is always fraught with serious consequences. It makes it possible for individual managers to violate government discipline. Here is another example. M. Tadeyev, chief of the UKS [Administration of Capital Construction] at the gorispolkom is also a member of the commission. In the report data, he showed the completion in September 1978 of a 178-apartment building, a school and a dormitory, although these facilities were not ready for acceptance in September or even later, when this matter was checked by the Party Control Committee at the CC CPSU. This was also true in other cases. As a result, for 11 months of last year (we will recall favorable reports of the builders) about 19,000 square meters of housing were added -- almost a quarter of the completed (according to the report, of course) area.

All of this was happening before the eyes of the Ordzhonikidze gorispolkom which formally, without going into the essence of the matter, approved acts of the government commission on accepting for operation housing and municipal facilities with large omissions and defects.

The question of the work of the government commission was not even once heard at the meeting of the ispolkom; it does not have a member of a trade union organization, while the individual members of the commission, taking advantage of the lack of supervision on the part of the gorispolkom, did not even consider it necessary to participate in the acceptance and, instead of coming themselves, sent unauthorized workers for this purpose.

For the permitted violations of the established order for accepting for operation completed housing and municipal facilities and for the nonfulfillment of the CC CPSU and the USSR Council of Ministers decree "On measures for improving the quality of housing and municipal facilities," the Party Control Committee of the CC CPSU called to strict party account N. Turenko, chairman of the Ordzhonikidze ispolkom of the City Soviet of People's Deputies and A. Tabolov, former administration chief of the "Sevostinpromstroy". The statement by A. Pankov, Deputy Minister of the USSR Industrial Construction, that the ministry made the proper conclusions and will put the matter in order in its subordinate "Sevostinpromstroy" Administration was accepted as information.

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## ELECTRONICS AND PRECISION EQUIPMENT

### 'INSTAMATIC' STYLE CAMERA EXPLAINED

Moscow SOVETSKOYE FOTO in Russian No 3, Mar 79 pp 39-40

[Article by V. Feday: "Editorial Staff Performs a Test"]

[Text] Let us begin with a little introduction.

At one of the artistic exhibitions I became interested in a man with a small box in his hands, the Kiev-30. The camera in the display is not a rarity. But the fact that its eyepiece unobtrusively, as if accidentally but intently, observes the very expressive faces of the visitors insures skill and resourcefulness in the photograph. The camera was almost invisible in his hand. He cocked, released and set it for a new exposure with the thumb of his right hand. With the hands with the camera crossed on his chest, he could swivel it straight ahead, right or left, photograph in the horizontal and vertical without changing his posture. With the lower hand slightly touching his thigh, the lens of the camera is aimed sideways which is also toward the back of the photograph. A horizontal orientation is produced with the camera in the right hand under the left elbow. Everything happening behind was visible by reflection in the glass. The natural posture did not betray to the person that he was being photographed.

Seldom touching his face with the hand holding the camera, he made as if to adjust his glasses and the barely heard click of the shutter did not disturb the composure of the exhibition situation.

Then he sat down in a free place, opened the camera and changed the cassette without looking, like a chain smoker reaches for a cigarette from a cigarette case. Several times, again without looking, he toyed with the box with his thumb, opening and closing it. No one paid any attention to this. I could see that they were losing their modest competition from the very beginning and my favorite, the Canon AE-1 with motor drive, stayed inoperative that day.

And there you have it, the Kiev-30. Its technical specifications are modest at first glance:

film used -- 16 mm;  
frame size -- 13 X 17 mm;  
number of exposures -- 25;  
built-in lens --  $f = 23$  mm;  
 $f$ /number -- 3.5 to 11;  
focus -- 0.5 to infinity;  
angle of view --  $50^\circ$ ;  
focal plane shutter with constant aperture size in front of lens;  
shutter speeds -- 1/30, 1/60 and 1/200;  
overall dimensions -- 28 X 47 X 84 mm;  
weight -- 190 grams.

Shutter release, film rewind and exposure counter operation are interconnected and done with a back and forth motion of the camera case. When it is pushed in, the film advances to the next frame; when pushed out, the film is clamped against the exposure aperture by a small pad using a flat spring.

The rectangular shape makes it possible to hold the camera in various positions. The rather wide angle of view and degree of magnification allow an approximate range to be specified and permit a certain mobility.

A flash can be used with any shutter speed since the shutter opens at all speeds with a fixed aperture for complete exposure. The shutter speed and stop aperture dials are located on the side of the pushed out part of the camera and coincide with the grip area during operation. The shutter release has a soft touch and the shutter action is quiet. A viewfinder of the simple screen type is open in the operating (pushed out) position of the device. The camera dimensions evidently do not allow the complete exposure field to be seen in the viewfinder. Because of this, it must be kept in mind that more will be visible in the frame (approximately 1.5 mm compared to the dimensions of the viewfinder).

The lens resolution is rather high. The small diameters of the lenses and the small focusing range simplify the task of setting the lenses for good quality.

Cassette loading of the camera has an important advantage. It makes it possible to change the film with an incompletely exposed cassette. In this case film losses are insignificant. Two frames are lost altogether. It is only necessary to remember to click the camera shutter twice before and after such a change.

The simple rewind mechanism and the lack of a ground roller ensure that the film will be drawn through to the trusted finish and the camera maker makes it possible to hold it in the hand, in your palm.

The assortment of non-perforated film produced is not large. There is an apparent need for high sensitivity film with increased resolution. However, perforated film such as "7 X 8 Super," "Nytrath" or AP-22 may be used.

High sensitivity film makes it possible to have a higher shutter speed and a "big" aperture. With proper development such film has a rather fine grain. Less active developing should be used for 16 mm film than for 35 mm film. The developing time must be reduced by one-third or the developer diluted by one-third with water. Precision in the exposure time chosen for 16 mm film is quite a bit more important than for 35 mm. After processing the film should be in a light gray form. Purity in the processing and care in handling help in avoiding accidental damage. If you have worked with 16 mm film before, there will be no problem in processing 16 mm film. The conventional double-deck tanks, enlarger and slide projector are suitable. The camera also may not compensate for trembling of the hand. During photography, it is necessary to find a support, the wrist or elbow of the second hand, the thigh, body or some kind of hand rest. Rapid shutter speeds help eliminate possible blurs from motion. The use of deep stop apertures makes it possible to define the exposure range precisely with the least exactions. Actually, in the majority of cases this has to be done "by eye."

In our opinion, for prints it makes sense to use a holder with two panes since the frame insert available in the camera kit does not straighten the film in the exposure aperture. Its design needs to be improved and then we can print without panes which can collect dust. Dust is always a serious problem when using 16 mm film.

It is important to make a habit of stabilizing the camera in the operating position, primarily, for accurate coincidence of the lens aperture and the case opening and, secondly, for precise clamping of the film to the exposure opening which is done at the end of an advance. The kinematic tolerances do not always insure precise friction. Maybe this is the reason for the complaints about inaccurate focussing (frequent misalignment to the side of the foreground). The production of 16 mm cameras in the world market is growing steadily. And it is not surprising that our magazine has paid as much attention to the earlier manufactured camera Kiev-Vega (see *SPETSIALNAYA YDIO* No 9, 1961; Nos 4, 5, 6, 1962; No 1, 2, 1963; No 10, 1964; No 8, 1966; No 6, 1967; No 9, 1969). These publications are of current interest also. The exceptional compactness and simplicity in handling make the Kiev-10 attractive to a broad group of amateurs and professionals, with all the advantages of the camera, what then keeps it from becoming a present-day bestseller in the photographic equipment market? The first reason is the lack of necessary equipment specifically for processing 16 mm film--compact enlargers with low-voltage lamps, slide projectors and slide frames.

Individual communications about the beginning of production of slide projectors for 16 mm film or special enlargers are gratifying but hardly sufficient by themselves to satisfy users and convince them to change to such a small format. An entire collection of these devices should appear on the store counter along with the camera. The second thing hindering a change to a smaller format is the user's dissatisfaction with the final results of his work even with 35 mm film. What would happen if the exposure area were cut by a fourth? These misgivings can be allayed only with a well set up,

centralized processing and delivery system for photographed and processed materials.



Figure 1. Front View: Left--Lens Opening; Right--Viewfinder

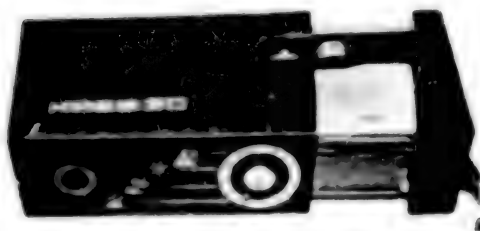


Figure 2. Camera in Operating Position: Left--Viewfinder Pupil; Center--Shutter Speed Dial; Top--Range Dial and Flat Release Button; Extreme Right--Synchronization Contact.



Figure 3. Side View of Stop Aperture and Speed Dials



Figure 4. Bottom View--Exposure Counter Aperture

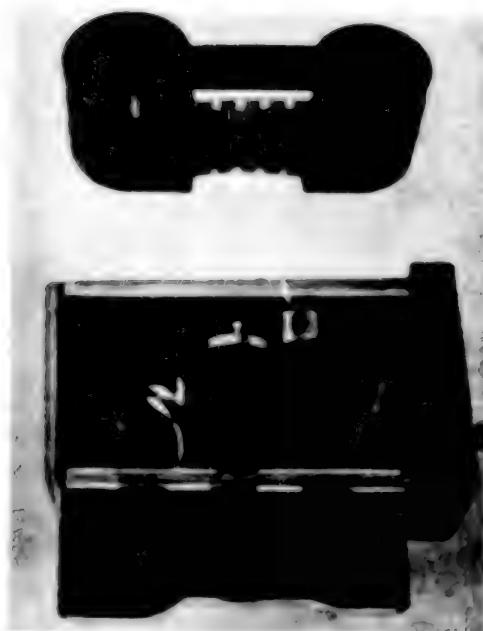


Figure 5. Camera during Reloading: Top--Cassette

No less important in all of this are the inherent operating defects of the camera: imprecision in stability of the operating position, proximity of the stop aperture and speed dials, lack of "B" shutter speed and tripod socket, rangefinder with blind markings which is inconvenient in active photography, pretentious but quite limited light meter, lack of brackets for the flash which should be mandatory in indoor photography. The reason for removing light filters from the camera kit is incomprehensible. As regards the film assortment, we think it may be small. The collection is quite adequate: Foto-65 with a 200 line/mm resolution, Foto-500 with a 120 line/mm resolution and color reversal film for natural and artistic illumination with a sensitivity of about 180 GOST units.

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## METALLURGY

### STAINLESS STEEL PRODUCTION METHODS

Moscow TRUD in Russian 11 May 74

[Article by A. Yakovlev and I. Ostravskiy. Criticism of a License Award]

(Text) Before the start of each year, a special commission comprising representatives from planning and supply organizations assigns quotas for stainless steel. The multitude of enthusiasts for the steel includes chemists, steel processors, construction workers and erectors, and furniture and appliance manufacturers. The demand for conventional types of metals would decrease substantially if there was a larger supply of stainless steel and if it could be used more boldly and more widely. It is not an unfounded claim when stainless steel is called the material of the century.

The manufacture of stainless steel is technically complex and expensive. It is produced in special furnaces using large amounts of electric power and chrome and nickel alloys. Consequently, stainless steel is in short supply, which is inadequate for plants and industry. Tens of thousands of tons must be imported.

Scientists the world over are seeking new ways to smelt high quality steel. The steel smelting laboratory at the Giprospetkovsk Institute of Metallurgy is one of the researchers. The supervisor of this work Candidate of Physical Sciences Ye. Nefedov states:

"We have been able to smelt stainless steel in a conventional converter. A small amount of technological development is now needed. In simple terms, the essence of the new process is as follows: an intermediate product, cast iron, with a high



chrome content, is obtained in a blast or an electric furnace. The product is then scavenged in a converter using oxygen, argon, and natural gas."

The method has been named gas-oxygen refining (GOR). Its innovation and originality have been defended in an inventor's certificate. The method allows for the rapid accumulation of a metal melt having a microscopic carbon content. The anti-corrosion and mechanical properties of such a stainless steel are substantially higher than those of traditional melts obtained in electric steel smelting units.

"When we started using the GOR method," continued Yu. Nefedov "we mainly had the planned Petrovskiy metallurgy plant in mind. The time had come to have the plant specialize in the production of a quality metal. The GOR method is the cheapest path in that direction."

The new method has vital importance for the plant. As early as the prewar years, the Petrovskiy plant was the largest in the industry. Subsequently, the eastern, southern, northern, and central gigantic plants overtook it, both in their volume of output and in engineering development. By a quirk of fate, the plant site had become surrounded by a tight cluster of city blocks. There was no room to expand.

The scientists decided immediately to take two worthwhile steps: to introduce an advanced method of smelting stainless steel and to assist the plant in getting on the track to modern high efficiency production. Management at the enterprise warmly supported this idea.

"We don't plan to fade away," said the director of the Petrovskiy plant, Hero of Socialist Labor V. Masov. "We want to adopt advanced ideas; our future lies in the implementation of the proposals of modern science."

The plant workers support the designers. Here is the opinion of a Ukrainian State Institute of Planning Metallurgical Plants specialist, project chief engineer V. Mamenko:

"We disagree with the authors of the general plan for development within the industry. How should the enterprise be preserved? The plant urgently needs to be redirected toward the production of quality metals. The introduction of the GOR method should act as a start in the rebirth of the old plant."

According to the calculations of the Ukrainian State Institute of Planning Metallurgical Plants, organizing for the production of 220,000 tons of stainless steel will cost 70 million

rubles. These are large expenditures, but they can be recovered in less than three years. This rate of return is unique to the industry. Metallurgists feel that it is worth investing resources even when they aren't repaid in three or four years.

Hundreds of melts have been completed at a pilot plant at the metallurgical institute. Calculations of the GOS method have been confirmed by others -- specialists from the Metallurgical Association "Tulachermet" (Tula Ferrous Metallurgy Association), who verified the calculations using 10-ton converters.

Thus everything seemed to be moving along a smooth path of assimilation into production. The GOS method had fervent supporters. A January 1978 decree of the Council of Ministers of the USSR State Committee for Science and Technology, which was signed by the deputy chairman of the committee, V. A. Lashin, states: "According to preliminary calculations of the Ukrainian State Institute of Planning Metallurgical Industry, the cost of one ton of steel was reduced by 60 rubles in comparison with existing smelting in electric furnaces, when stainless steel was produced in the amount of 22,000 tons per year by the gas-oxygen refining method at the Petrovskiy plant." And so onward to further specific plans for implementing the new technology.

The Ukrainian SSR Council of Ministers and the Ministry of Ferrous Metallurgy in the republic approved the new method. All of the data indicate that production of stainless steel should succeed at the old plant during this five-year plan.

But at the close of last year, the USSR Ministry of Ferrous Metallurgy decided to purchase the stainless steel refining process of the American company Union Carbide, which is called argon-oxygen decarbonization (AOD).

This is an excellent and reliable technology and has been used in many countries. Almost 100 AOD units are operating around the world. These units are smelting more than 6 million tons of the steel. Nevertheless,

"If this decision had been taken 5 or 7 years ago, we could only have welcomed it," commented V. Grunin, a chief process engineer in the steel smelting department of the Ukrainian State Institute of Planning Metallurgical Industry. "At that time we had nothing that was competitive with the AOD method. Now, however, we do have our own technology, which is only equivalent to the American one, but in many ways better than it."

We are far from the point of advocating the work of those from Dnepropetrovsk and Tula simply because they are home bred. The GOR method does in fact possess all of the advantages of the foreign method: cheapness, high productivity, and the capacity to produce steel that cannot be smelted using other methods.

The inventors of the GOR method also have succeeded in avoiding the serious flaws of the American technology, such as increased expenditure of argon and the poor durability of linings. Because of this, the Soviet method in terms of equal costs is one-and-a-half times more productive.

Can it be possible that the USSR Ministry of Ferrous Metallurgy was unaware of these facts? Is it possible that they failed to weigh all of the pros and cons before they decided to acquire a license? They did know and they did weigh the facts. But they opted for the foreign experience.

Two primary objections are raised against the GOR method. N. Savelov, a deputy director in the Main Technical Administration of the USSR Ministry of Ferrous Metallurgy feels that it is not possible to obtain high-chrome cast iron in blast furnaces. Citing the foreign experience, he writes: "The available sources in the literature show that the expenditure of coke for a one-ton melt amounts to 1,500 to 4,000 kilograms. Based on this fact, completion of the succeeding stages of production of stainless steel using the proposed technology becomes a meaningless exercise."

But these very same facts are supported by the wartime experience of the Urals blast furnace workers, who succeeded in smelting cast iron containing a high-chrome content for the production of steel armor. There is also evidence that Czech metallurgists are smelting ferrochromium in blast furnaces.

Even though the USSR Ministry of Ferrous Metallurgy does not believe that our machine builders are capable of manufacturing equipment for the GOR method, specialists in the All-Union Scientific Research Institute of Metallurgical Machine Building, which is run by the academician A. Tselikov, are prepared to design a new type unit. The "Zhdanovtyazhmash" [Zhdanov Heavy Machinery] Association, a basic supplier of Soviet steel smelting equipment, is agreeable to manufacturing the unit. In fact, they are already making attachments in Zhdanov which permit a standard converter in the Petrovskiy plant to be converted into a GOR unit. What is it then that prompted the Ministry of Ferrous Metallurgy to select the lesser of the two methods?

If there had been some assurance that the purchase of foreign supported technology would not slow down the development of the domestic method, it should be squelched. Certainly, it is not wrong when two methods compete side by side and each one of them in practice will demonstrate its superiority. But the scientists, production workers, and project designers probably fear that the ministry's selection of the foreign method will result in serious interferences with their work. Furthermore, the fate of the Petrovskiy plant hinges on the ministry's decision.

Obviously, it is not just a matter of priorities, but also a matter of the very future of the reliable old plant. Also, the productive ideas of the scientific school of the Magnitogorsk and Tula steel smelters will be stifled unless they are supported and given opportunities to be put into practice.

So, which is it the GOR or the AOD method? Evidently, this problem must be resolved not only by the USSR Ministry of Ferrous Metallurgy but also by the State Committee for Science and Technology, and by other organizations that are responsible for the assimilation into production of scientific research results and for the growth of the technological level of the heavy industry.

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